Bloomberg Businessweek

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Tick Tick Tick

Lyme disease has exploded in recent years, but a new vaccine may—finally—be close

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Bloomberg Businessweek

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◀ Sally Ride during training in 1978. NASA later chose her to be the first US woman in space

COURTESY NASA

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■ COVER TRAIL

How the cover gets made

❶

"So this week's story is about—"

"WHAT?"

[Loud barking and hissing]

"Where are you?"

"I'M AT THE VET AND IT'S INTENSE IN HERE."

[Barking recedes]

"Oh no! Is everything all right? Wait.... You have a pet?"

"I don't! But I have two big fears: living under the continued tyranny of the typeface Helvetica and contracting Lyme disease."

"You know this week's cover story is about the quest for a Lyme vaccine, right?"

"Yes, that's why I'm here! I couldn't get into the human trials, but the dog vaccine is already approved so I made a vet appointment instead."

"That seems like a really bad idea."

"Will this decision affect my midyear performance review?"

"Just tell me you have a plan for the cover?"

"Ticks, of course!"



Cover: Illustration by Vartika Sharma

BUSINESS: PHOTOGRAPH BY SHAWN MICHAEL JONES FOR BLOOMBERG BUSINESSWEEK

Bringing Communities of Support to Students



At Communities In Schools, we place knowledgeable and caring adults inside schools. These site coordinators surround students with a community of support to ensure they have access to everything they need to engage in learning, graduate, and succeed in life. We are there for them fostering life skills, providing mentor support, academic enrichment and resources like school supplies, meals, and access to technology.

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● After disclosing plans to cull jobs and close or downsize offices to curb costs, Charles Schwab turned to the bond market to raise fresh debt. The financial-services company sold $2.35 billion of senior unsecured notes in a two-part deal on Aug. 22. That day, Schwab's shares fell as much as

5.2%

● War in Ukraine

► Wagner mercenary chief Yevgeny Prigozhin was on a private jet that crashed on Aug. 23 on its way from Moscow to St. Petersburg, according to Russian aviation authorities; everyone onboard was killed. Although Prigozhin led a mutiny that directly challenged Vladimir Putin's rule, he escaped any retaliation under a deal brokered by Belarus President Viktor Lukashenko.

► In its eighth attack on Ukraine's ports since it quit the grain deal, Russia sent drones to strike crop terminals at Izmail on the Danube, ruining 13,000 tons of grain bound for Romania and Egypt.



● Children in Chennai on Aug. 22 cheer for the success of India's Chandrayaan-3 near the moon's South Pole. The spacecraft landed safely on Aug. 23 and began its search for water. Just days earlier, Russia's Luna-25 crashed in the same area.

● In Guatemala, Bernardo Arévalo won the presidency in a landslide.

The antigraft campaigner pledged to weed out the "systemic corruption" he says keeps the nation mired in poverty. Arévalo won 58% of the vote in the Aug. 20 runoff, versus 37% for former first lady Sandra Torres, who hasn't conceded; her party alleges there were electoral irregularities. President Alejandro Giammattei has already congratulated Arévalo.

● Africa's largest startup, the payments company Flutterwave, is pressing ahead with plans for an IPO in New York and possibly Nigeria. Co-founder Olugbenga Agboola said the company was close to resolving allegations of financial impropriety in Kenya, a key market. Its most recent private funding round, in January 2022, valued Flutterwave at

$3b

● Thailand has its first elected leader since the military coup of 2014.



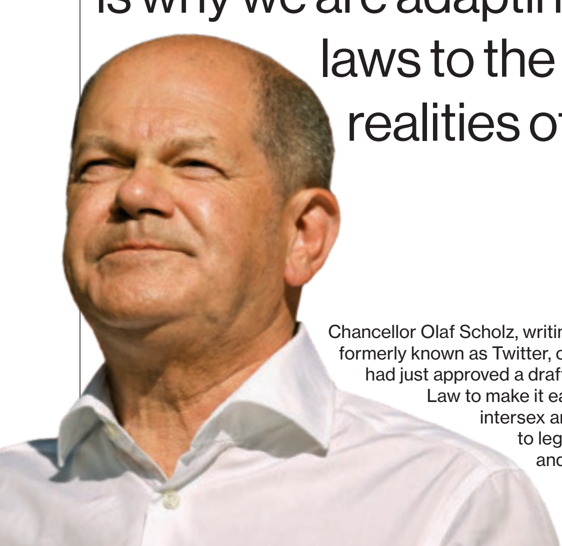
Three months after an election that represented the biggest challenge in years to Thailand's royal establishment, the country finally has a new prime minister—who has the support of forces aligned with the palace. Srettha Thavisin, 61, a former property tycoon, won 482 of 747 votes in a joint session of parliament on Aug. 21. King Maha Vajiralongkorn endorsed his appointment on Aug. 23 in the *Royal Gazette*.

● The US National Park Service says there were 312 million visits to the country's forests, monuments, historical sites and other parks in 2022, about 5% shy of the pre-pandemic record of 327 million. In a report published on Aug. 21, NPS economists said those travelers spent a record

$24b

in communities within 60 miles of the parks.

● "Germany is diverse. That is why we are adapting our laws to the different realities of life."



Chancellor Olaf Scholz, writing on X, the platform formerly known as Twitter, on Aug. 23. His cabinet had just approved a draft Self-Determination Law to make it easier for transgender, intersex and nonbinary people to legally change their name and gender.

● A female baby white rhino born at Germany's Zoo Schwerin ventured outdoors for the first time on Aug. 21. She's the first white rhino born at the zoo, which has been home to the animals since 1981. The zoo asked the public to choose between the names Kiah, which means "sunrise" in Swahili, or Kuimba, "the singing one."



● Japan will begin pumping treated radioactive water into the Pacific on Aug. 24.

The discharge of more than 1 million cubic meters of water from the wrecked Fukushima reactor could take decades. Protests and boycotts of Japanese products have taken place in China, Hong Kong and South Korea. In July the International Atomic Energy Agency said Japan's proposal was safe, but its neighbors disagree: The ocean is "not Japan's private sewer," Chinese Foreign Ministry spokesman Wang Wenbin said in June.

INDIA: R. SATISH BABU/GETTY IMAGES. THAVISIN: LILIAN SUWANRUMPHA/GETTY IMAGES. SCHOLZ: JOHANNES SIMON/GETTY IMAGES. RHINO: JENS BUTTNER/GETTY IMAGES. ILLUSTRATION BY KAREN YOOJIN

August 28, 2023

The US Export of Gun Violence Is an Outrage

● By Michael R. Bloomberg

President Joe Biden's administration is inadvertently worsening a problem it's trying to solve–the migrant crisis at the southern border–by facilitating a surge in gun-fueled violent crime in Latin America and beyond. The president, long a champion of gun safety, needs to move quickly to fix this policy failure.

The number of semiautomatic firearms exported from the US has more than doubled since 2016. These sales have generated big profits for the gun industry while causing mayhem throughout the region, including at the US-Mexico border.

Guatemala is a case in point. Sales of US-made semiautomatic firearms to Guatemala are more than five times higher than in the 2010s and almost double what they were only two years ago. US gunmakers often sell to governments and security firms, but the weapons soon find their way onto the black market and into the hands of criminals. After years of decline, murders in Guatemala have spiked, as have the numbers of Guatemalans fleeing to the US. Of the 2.2 million people who arrived at the southern border last year, 10% were Guatemalan, more than any other country save Mexico.

Far from seeking to stop the region's gun crisis, the US government has been complicit in it. The problem began with former President Donald Trump's administration, which in 2020 took the licensing process for gun exports away from the Department of State, which was responsible for reviewing applications for national security concerns, and gave it to the Department of Commerce. The National Rifle Association called the switch "among the most important pro-gun initiatives by the Trump administration to date."

Even before the agency switch, auditors warned that 95% of gun-export applications lacked required information and were not being properly vetted to consider US national security concerns. The problem has worsened with Commerce in charge.

Instead of hitting the brakes on exports to troubled nations, department officials have been greasing the wheels, aggressively recruiting foreign buyers and connecting them with US manufacturers. A department report even called demand for US guns in nations suffering from political instability, gang violence and drug trafficking "a unique opportunity." Not surprisingly, the value of export license approvals shot up 30% over historical averages.

Although Guatemala has been a convenient target for the US gun industry, it's hardly alone. Mexico has long complained about the flow of US firearms to drug traffickers, and countries across Central America and far beyond are suffering from an influx of US guns.

Solving this problem doesn't require new legislation. US law already requires the government to ensure that it enforces export controls "to deter human rights violations and abuses, distance the United States from such violations and abuses, and avoid contributing to civil disorder in a country or region." The willingness of both the Trump and Biden administrations to openly flout the will of Congress–undermining border security, costing taxpayers and endangering lives in the process–should be cause for bipartisan outrage.

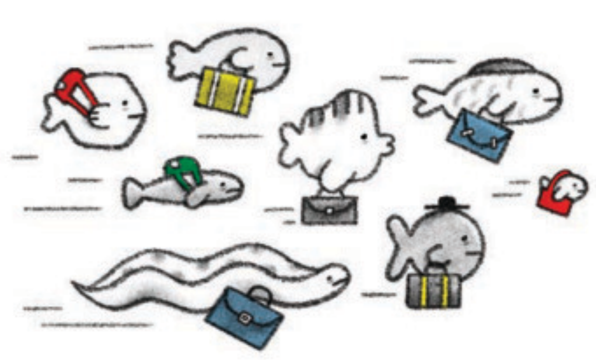
The Biden administration needs to act swiftly. Commerce Secretary Gina Raimondo, who's earned a well-deserved reputation as an outstanding administrator in Washington and as governor of Rhode Island, inherited this problem and allowed it to grow. She should waste no time in tightening export controls and putting the US back in compliance with the law.

The administration should also bar exports to countries with corrupt and repressive law enforcement agencies and security forces. Sales to those countries create problems that inevitably end up on the US's doorstep. It's shortsighted in the extreme to think that mass sales of guns to troubled foreign nations is good for Americans.

Republicans who have assailed Biden for failing to secure the southern border should be the most vocal in demanding action. Those who fail to do so only underscore what's long been true: Too many politicians fear the gun lobby and do its bidding, public safety–and now border security–be damned.

For more commentary, go to bloomberg.com/opinion

■ AGENDA



► Workers Paradise

The US Bureau of Labor Statistics puts out its August unemployment data on Sept. 1. Despite the US Federal Reserve's inflation-fighting rate hikes, analysts expect joblessness to stay historically low, at about 3.5%.

► The euro area, France and Italy publish their latest year-over-year inflation data on Aug. 31. The rate of price increases continues to fall across the region.

► China's NBS and Caixin Manufacturing PMIs, measuring the health of Chinese industry, come out on Aug. 30 and 31, respectively. Both have been weak lately.

► Aug. 28 is the 60th anniversary of the March on Washington and Martin Luther King Jr.'s immortal "I Have a Dream" speech. Activists held a commemorative march on Aug. 26.

China's Hot Mess



Downtown Shanghai

Xi Jinping's attempts to deflate a real estate bubble could end up sinking the economy

By Bloomberg News

Three years ago, China cracked down on a booming real estate sector to reduce risk and make homes more affordable—part of President Xi Jinping's "common prosperity" drive.

Beijing may have gone too far, it now seems. Country Garden Holdings Co., once a pillar of the industry, is on the verge of default, suggesting that no developer is too big to fail. There are signs the situation is spiraling, too. More developers are on the brink, home prices are collapsing in smaller cities, and fears of contagion have spread to the nation's $60 trillion financial system. When shadow bank Zhongrong International Trust Co. missed payments on dozens of high-yield investment products in August, investors protested outside its headquarters in the Chinese capital.

"Property booms and busts are typically extreme but especially in China's case," says George Magnus, author of *Red Flags: Why Xi's China Is in Jeopardy*. "The sector is so big in relation to the economy and so significant in terms of household savings and confidence."

For years, China's debt-fueled property boom underpinned one of the world's great economic miracles. Even though it was bound to be unsustainable, the speed at which it now seems to be unraveling has been startling, compounding challenges for

CFOTO/FUTURE PUBLISHING/GETTY IMAGES

a Chinese economy already beset by weak consumer demand, slumping exports and growing tensions with the US.

In many ways, the current real estate meltdown is a crisis of the government's own making. China's privatization of property in the 1990s created one of the largest transfers of wealth in the country's history, and entrepreneurs leapt at the opportunity to borrow heavily. The boom invigorated local governments, global bond investors and China's middle class, and real estate grew to play an enormous role in the economy. At its peak, the sector directly and indirectly accounted for about a quarter of domestic output and almost 80% of household assets. Estimates vary, but counting new and existing homes, plus inventory, the sector was worth about $52 trillion in 2019—about twice the size of the US real estate market.

Yet all that roaring growth made prices unaffordable for a younger generation, challenging Xi's bid to narrow the wealth gap. In late 2020, China Evergrande Group's liquidity scare triggered aggressive regulatory tightening. Coupled with two bruising years of Covid-19 lockdowns, developers including Evergrande and Sunac China Holdings Ltd. defaulted. Global bondholders, who'd provided a major source of real estate financing, were spooked by the alarming rate of distress, pushing up funding costs. Eventually the $200 billion market for real estate bonds—once one of the most profitable trades in high-yield dollar debt, aka junk bonds—all but vanished.

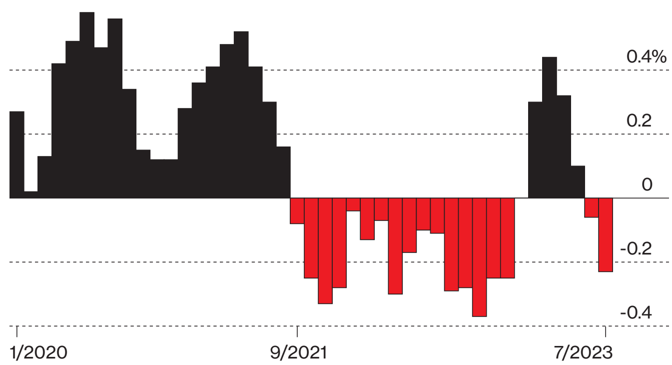
Almost a third of all 498 dollar bonds issued by Chinese developers are in default, according to data compiled by Bloomberg, leaving $60 billion in unpaid debt to investors including Pacific Investment Management Co. and Fidelity International Ltd. The rash of failures may be just starting. The government is showing little inclination to bail out developers such as Country Garden, formerly the biggest by sales. Almost half of the 38 publicly traded state-owned real estate companies reported preliminary losses for the first half of this year.

Of increasing concern are the shadow banks, which funneled money into real estate outside the regular banking system. Many such firms—Zhongrong, among them—had propped up developers in a bet on a post-pandemic rebound that quickly petered out. Zhongrong's major shareholder is now trying to restructure its debt, which includes billions of dollars owed to individual buyers of its investment products.

While the woes have spread to China's giant commercial banks—the amount of soured real estate loans at the 10 biggest lenders will likely soar to $120 billion next year assuming the rate of nonperforming loans triples from 2022, according to Bloomberg Intelligence—the bigger concern is falling home prices. Official statistics show a steady drip of monthly declines of less than 1%; reports from agents show drops of 15% or more in some areas over the last two years. Even though it helps Beijing's affordability push, the new numbers have shattered consumer confidence. After years of gains, Chinese consumers had come to see real estate as a can't-miss investment, prompting some to buy multiple apartments to profit from the rally. For those who borrowed, paying their expensive mortgages will make less sense the lower property values go.

New Home Prices in China

Month-over-month change in new residential real estate prices



DATA: NATIONAL BUREAU OF STATISTICS 70-CITY AVERAGES COMPILED BY BLOOMBERG INTELLIGENCE. EXCLUDES STATE-SUBSIDIZED HOUSING

That model of never-ending gains is now broken, and soaring youth unemployment—numbers are so high the government has stopped publishing the data—means the next generation could be less inclined to buy homes of their own. The ripple effects are noteworthy. Wall Street banks have cut growth estimates for the world's second-largest economy to less than 5%, and Chinese assets are in free fall, with stocks and bonds tumbling and the currency trading close to a 16-year low.

Beijing is trying to prop up the sector. While refraining from a full bailout, the government is trying to get cash flowing to the stronger, mostly state-owned developers. And officials are pushing to get stalled projects completed after hundreds of thousands of homeowners boycotted mortgage payments last year to protest delays. On Aug. 15, the central bank made its steepest cut in three years to a key interest rate.

Now all eyes are on whether China will soften homebuying restrictions, such as easing existing mortgages and lowering down payments in big cities including Beijing and Shanghai, which would show a stronger sign of support. "I can't see the economic situation getting better in China until there is more certainty around supportive government policy. It all seems to be mainly risk and downside these days," says Christopher Marquis, a professor at Cambridge Judge Business School.

What's clear is that the real estate industry in China could look very different in the next few years, as more private developers shut down or resort to becoming construction or service companies. Ultimately, a rapidly aging population and looming peaks in urbanization mean the glory days of property are over, and it will take years to work off excess inventory. The liabilities of the private sector will have to be written off, leaving state-owned companies with a larger share of the market.

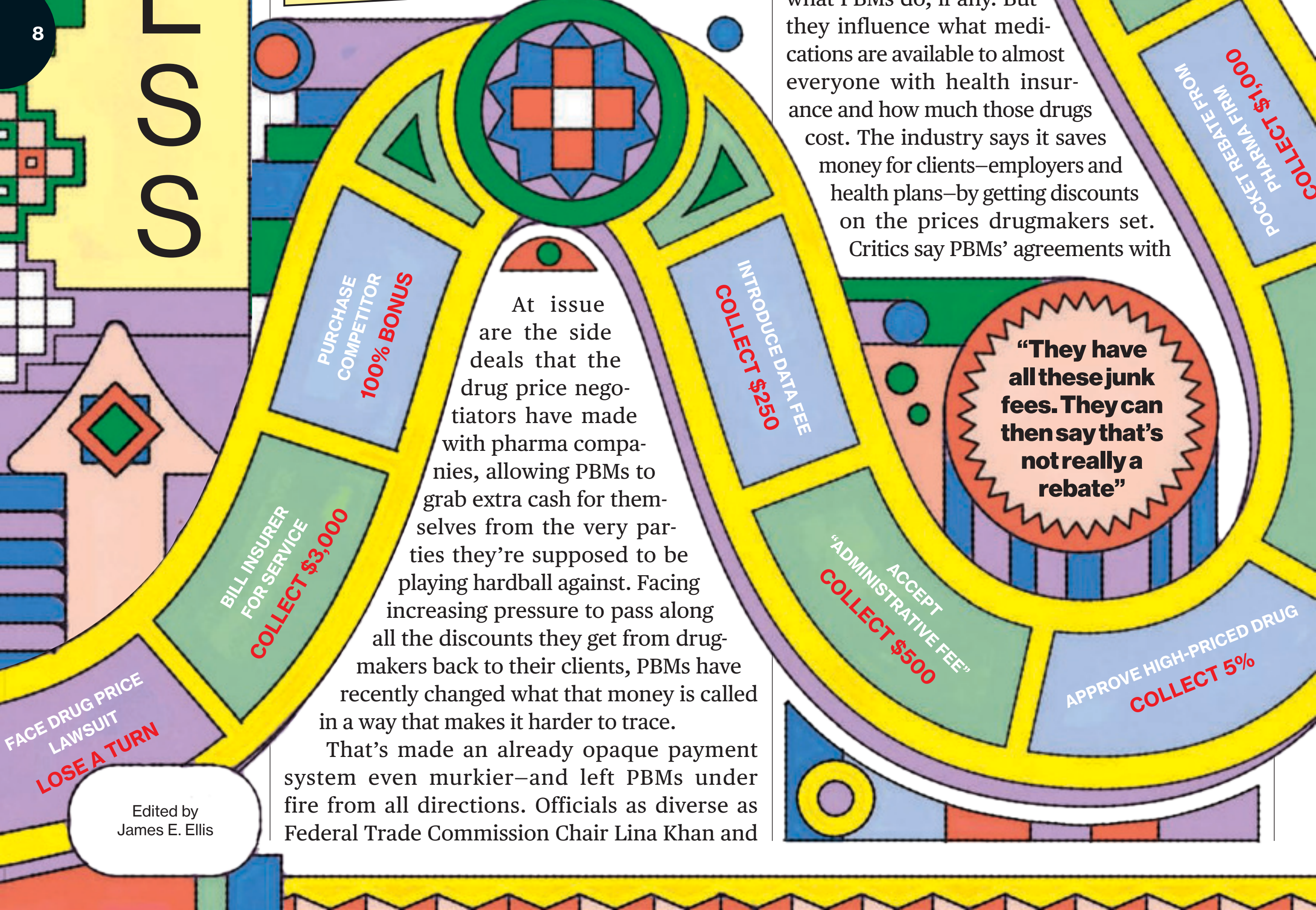
"With luck, and robust policymaking, China might transition to a less real-estate-dependent economy in the coming decade," says *Red Flags*' author Magnus. "But it could also be a very messy process and entail financial instability and economic and social disruption."

In other words, replacing real estate as a source of economic growth while also supporting the nation's vast middle class has become urgent challenge for Xi. Again. Ⓑ

A Lucrative Drug Benefits Game

Pharmacy benefit managers bring drug prices down. They also pocket drugmakers' cash

Pharmacy benefit managers (PBMs) arose in the 1960s to help health insurance plans control spending on prescription drugs. They were lauded early on as a counterweight to drug companies, able to bundle the purchasing power of thousands of employers and insurers to negotiate lower prices for medicines. But these days, they're frequently accused of being one of the causes of higher drug prices rather than a solution to them.



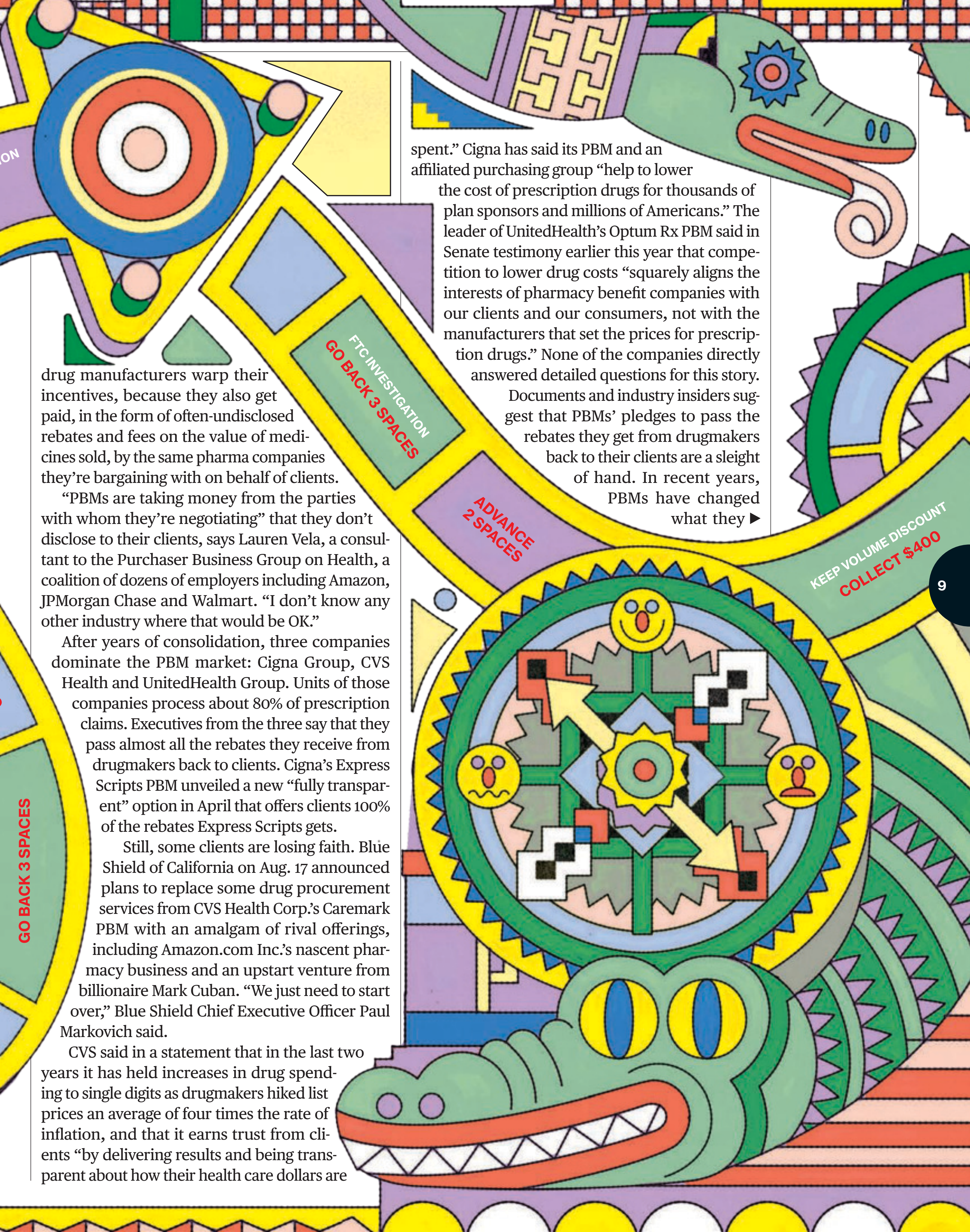
At issue are the side deals that the drug price negotiators have made with pharma companies, allowing PBMs to grab extra cash for themselves from the very parties they're supposed to be playing hardball against. Facing increasing pressure to pass along all the discounts they get from drugmakers back to their clients, PBMs have recently changed what that money is called in a way that makes it harder to trace.

That's made an already opaque payment system even murkier—and left PBMs under fire from all directions. Officials as diverse as Federal Trade Commission Chair Lina Khan and Florida Governor Ron DeSantis want more transparency from them. And Congress is advancing bills to force more disclosure about their deals with pharma companies.

Most Americans may only have a hazy idea of what PBMs do, if any. But they influence what medications are available to almost everyone with health insurance and how much those drugs cost. The industry says it saves money for clients—employers and health plans—by getting discounts on the prices drugmakers set. Critics say PBMs' agreements with

> **"They have all these junk fees. They can then say that's not really a rebate"**

Edited by James E. Ellis



drug manufacturers warp their incentives, because they also get paid, in the form of often-undisclosed rebates and fees on the value of medicines sold, by the same pharma companies they're bargaining with on behalf of clients.

"PBMs are taking money from the parties with whom they're negotiating" that they don't disclose to their clients, says Lauren Vela, a consultant to the Purchaser Business Group on Health, a coalition of dozens of employers including Amazon, JPMorgan Chase and Walmart. "I don't know any other industry where that would be OK."

After years of consolidation, three companies dominate the PBM market: Cigna Group, CVS Health and UnitedHealth Group. Units of those companies process about 80% of prescription claims. Executives from the three say that they pass almost all the rebates they receive from drugmakers back to clients. Cigna's Express Scripts PBM unveiled a new "fully transparent" option in April that offers clients 100% of the rebates Express Scripts gets.

Still, some clients are losing faith. Blue Shield of California on Aug. 17 announced plans to replace some drug procurement services from CVS Health Corp.'s Caremark PBM with an amalgam of rival offerings, including Amazon.com Inc.'s nascent pharmacy business and an upstart venture from billionaire Mark Cuban. "We just need to start over," Blue Shield Chief Executive Officer Paul Markovich said.

CVS said in a statement that in the last two years it has held increases in drug spending to single digits as drugmakers hiked list prices an average of four times the rate of inflation, and that it earns trust from clients "by delivering results and being transparent about how their health care dollars are spent." Cigna has said its PBM and an affiliated purchasing group "help to lower the cost of prescription drugs for thousands of plan sponsors and millions of Americans." The leader of UnitedHealth's Optum Rx PBM said in Senate testimony earlier this year that competition to lower drug costs "squarely aligns the interests of pharmacy benefit companies with our clients and our consumers, not with the manufacturers that set the prices for prescription drugs." None of the companies directly answered detailed questions for this story.

Documents and industry insiders suggest that PBMs' pledges to pass the rebates they get from drugmakers back to their clients are a sleight of hand. In recent years, PBMs have changed what they ▶

◀ call some of the money they take from pharma. Instead of rebates, these payments now go by such names as "administration fees," "data fees" or "inflation protection."

The shift allows PBMs to retain money from drugmakers while telling clients that they're fully passing along all the rebates, critics say. "They have all these junk fees," says Trond Waerness, founding president of Atna Consulting Services, which works with small and midsize pharmaceutical manufacturers. "They can then say that's not really a rebate." What's more, the fees are pegged to a drug's list price, even though the expense of handling a prescription "does not cost any more if the drug is $2,000 or $200," Waerness says. "It's the exact same work, but on one drug you're charging 10 times more."

The FTC is probing these arrangements. In 27-page subpoenas sent to PBMs last year, the antitrust regulator asked for details not just of rebates but about "any other remuneration or consideration from drug manufacturers" and how much of that money they retain. More recently the FTC subpoenaed PBM affiliates called group purchasing organizations. These entities, formed in the last few years, have taken over some rebate negotiations, adding a layer to the convoluted path—and another tranche where fees could be collected—between companies that sell medicines and patients that take them.

Court records shed some light on the payments. Insys Therapeutics, the maker of a fentanyl spray called Subsys, filed for bankruptcy in 2019 after its founder and other executives were convicted in a racketeering case of bribing doctors to prescribe it. Throughout the turmoil, Cigna's Express Scripts continued to invoice the drugmaker for rebates and other fees connected with the fentanyl prescriptions that Express Scripts members filled.

Express Scripts got an administrative fee of 4.875% of the drug's list price for each prescription of Insys' products, according to a contract with the drugmaker that lawyers for Express Scripts filed at a Delaware bankruptcy court in 2021. The contract notes that the fee is "separate from the applicable rebate amount." Invoices filed in court show that administrative fees and "inflation protection" charges made up a quarter of what Express Scripts billed Insys for. Even if Express Scripts passed along all the rebate money to clients, that was only 75% of what it said Insys agreed to pay.

Investigators from the Senate Finance Committee, in a 2021 report on insulin costs, wrote that "PBMs have been collecting substantially greater revenue from administrative fees" as insulin prices went up. An agreement between UnitedHealth's Optum Rx PBM and Sanofi provided to the committee says Optum Rx's administrative fee is 4.75% of the drug's list price, and "it will not agree to pass through the administrative fee."

The Senate report said the total value of these administrative fees "is not known" because the contracts are confidential. Because PBMs also get separate fees from their health plan clients for managing their drug plans, they're "essentially profiting from all sides of the transaction," according to the report.

States and municipalities have filed a series of lawsuits against the three largest PBMs and the three major makers of insulin—Eli Lilly & Co., Novo Nordisk and Sanofi—alleging that both sides worked together to drive up prices. One case filed by the city of Cleveland in July alleges that PBMs profit by "retaining a significant, but undisclosed, share" of money from drugmakers. The lawsuit argues that such terms as "administrative fees," "service fees," "inflation fees" and "volume discounts" are "industry monikers designed to obfuscate the substantial sums being secretly exchanged" between PBMs and insulin manufacturers.

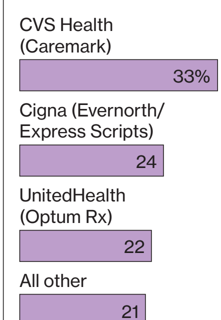
All three of the major insulin manufacturers say they work to help patients afford the medication. Sanofi says its pricing practices comply with the law. Setting PBM fees as a percentage of list prices "incentivizes higher list prices," a Sanofi spokesperson said, adding that some companies expect 8.5% in fees before rebates. The company doesn't know how PBMs or insurers use the rebates and fees it pays, or whether they're passed on to clients or patients.

In a statement, a Novo Nordisk A/S spokesperson said the insulin lawsuits "are without merit" and that the company has offered patients help affording insulin. Lilly didn't comment on the litigation and has disputed the allegations in court filings. In response to questions, the company referred to comments CEO David Ricks made to Congress in May in which he advocated "delinking other actors' revenue streams from a medicine's list price" and making sure that a drug's rebate lowers the cost for people who take the medicines. Cigna, CVS and UnitedHealth have also disputed the allegations in insulin lawsuits in court and say they've worked to bring down insulin costs.

PBMs give clients "as much information and data as requested, all of which is negotiated in an arm's length contracting process," said Greg Lopes, a spokesperson for the Pharmaceutical Care Management Association trade group, in an email. Beyond rebates, "drug companies may choose to contract with PBMs for bona fide services," such as monitoring side effects.

In the fine print of their contracts with health plans and employers, PBMs make clear that they

▼ Pharmacy benefit manager market share, 2022



PREVIOUS SPREAD: ILLUSTRATION BY NOAH PELLETIER. THIS SPREAD: PHOTOGRAPH BY SHAWN MICHAEL JONES FOR BLOOMBERG BUSINESSWEEK. DATA: DRUG CHANNELS INSTITUTE, CENTERS FOR MEDICARE & MEDICAID SERVICES. MARKET SHARE BY TOTAL EQUIVALENT PRESCRIPTION CLAIMS MANAGED

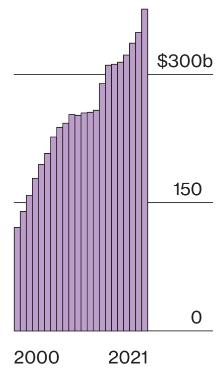
intend to profit from drugmakers they're negotiating with. Express Scripts contracts with manufacturers "for its own account" and "may realize positive margin" from them, according to language from publicly available contracts with such groups as the Kentucky Teachers' Retirement System and the government of Jersey City. Express Scripts may get other compensation from drugmakers that "is not part of the formulary rebates or associated administrative fees," and may profit from it, the contract says.

Congress is considering tightening the rules. Committees in both houses are advancing bipartisan bills to regulate PBMs. One passed by the Senate Finance Committee would bar PBMs from charging drugmakers fees as a percentage of a drug's price. Instead, the fees would have to be flat dollar amounts reflecting fair market value of whatever services they're performing for pharma companies. It would only affect Medicare drug plans, though a separate bill would apply to private plans.

Severing the link between fees and drug prices "is probably the most significant thing" Congress could do to change how PBMs operate, says Spencer Perlman, a health-care analyst with Veda Partners. But he says there's no simple fix. "Lawmakers are always playing whack-a-mole," Perlman says, "and they're always a little bit behind." —*John Tozzi*

THE BOTTOM LINE Congress and regulators are scrutinizing the practices of pharmacy benefit managers, whose opaque contracts with drugmakers could clash with their clients' interests.

▼ US retail prescription drug spending



Can Faux Milk Break The Fake Foods Curse?

● It's fermented using the DNA code of real cows. But skeptical consumers could still balk

First came plant-based meat, then lab-grown chicken. Now startups are betting that the next big thing in food technology will be animal-free dairy.

Ryan Pandya, chief executive officer of Perfect Day Inc., which makes dairy ingredients through a laboratory process similar to that used to produce synthetic insulin, once had high hopes of building his own consumer food brands. But as other faux foods pioneers struggle to win over wary consumers and investors, Pandya is shifting away from its own brands and instead focusing on selling milk proteins that can be used by multinational food companies in their supply chains. Pandya is betting food giants will be eager for a product that has a taste advantage over plant-based milks—and that can help them meet their emissions goals by reducing the role methane-belching cows play in their supply chains.

"We're not coming to the Starbucks of the world and saying, 'Why don't you blend coconut milk into your milk?' No one wants that," Pandya says. "We have made a change that you'll never be able to tell."

Startups like Perfect Day have generated buzz by developing ingredients for ice cream, cream cheese and pizza made through precision fermentation, in which engineers encode a cow's DNA into microorganisms that feed on a nutrient broth to produce proteins. Unlike plant-based milks, precision fermentation's products are indistinguishable from those made by cows, says Pandya, avoiding the usual complaints about sacrificing taste or texture.

Berkeley, California-based Perfect Day is an industry leader, with backers such as Hong Kong billionaire Li Ka-shing's Horizons Ventures, Singapore's state-owned Temasek Holdings and Walt Disney Co. CEO Bob Iger. Danone SA in April invested in Israel's Imagindairy Ltd., and last November Seoul-based CJ CheilJedang Corp., a ▶



◀ An ice cream sandwich made with Perfect Day milk

◀ big maker of frozen pizza in the US, invested in California-based New Culture.

Even New Zealand's Fonterra Cooperative Group, the world's largest dairy exporter, last year teamed with Swiss chemicals maker DSM-Firmenich AG to form Vivici BV, which plans on introducing its first animal-free whey protein, beta-lactoglobulin, to be used in everything from Greek yogurts to nutrition products for seniors, in early 2024.

There's a major hurdle on the road to the cowless future, however. After years of excitement about alternative proteins, many investors have lost their appetite for food-tech companies. Fermentation companies, including dairy startups, attracted about $840 million in investment last year, down 50% from a record year in 2021, according to the Good Food Institute, a think tank focused on alternative proteins. Beyond Meat Inc. shares plunged as much as 22% on Aug. 8 after the plant-based meat company said it's unlikely to have positive cash flow by the end of 2023. And Swedish plant-based milk maker Oatly Group AB's shares have plummeted about 40% since the company in late July cut its sales outlook.

That's leading to a tougher climate for newcomers, says Matt Gibson, CEO of New Culture. "A lot of the Beyond Meat baggage has been cast over the space," he says. New Culture is developing animal-free casein to use in mozzarella cheese, with launch scheduled for next year.

Another company reconsidering plans hatched during the heyday of investor enthusiasm is Israel-based Remilk Ltd. In April 2022 it announced plans to build the world's largest precision fermentation facility in Denmark. That plan is now "on hold," says CEO Aviv Wolff, and Remilk has instead secured other capacity.

Perfect Day has been scaling back some of its ambitions, too. The company, which has raised $750 million since its 2014 launch, sells its own brands of ice cream and other products in the US, Hong Kong and Singapore. But in July it decided to unload its consumer brands business and lay off about 130 employees, 15% of its total, to focus on supplying dairy ingredients to established food companies such as Nestlé. "The real goal for us is to leverage the companies that buy and sell huge amounts of product every day," says Pandya. "There's a much more sober focus now on building resilient strong businesses that can stand on their own two feet."

Each startup has its own tweaks, but the technology is similar. It starts with identifying the right microorganism and then using gene-editing technology to add a DNA sequence from the cow genome with the instructions to produce the target protein they want to sell.

"Because this genetic info is already available in online databases, this is done without ever touching a cow," says the website of TurtleTree, a Singapore-based food-focused biotech startup backed by investors including Saudi Prince Khaled bin Alwaleed, son of billionaire Alwaleed bin Talal. The microorganism with the new DNA then gets mixed with a nutrient-rich broth in a bioreactor, where it can begin producing the desired protein. Once the fermentation process ends, the protein is separated from the other materials in the reactor.

"Drying is often performed to take the final product from a liquid to a solid powder state," according to TurtleTree, which in March said it will launch its milk protein lactoferrin, now used in supplements and infant formulas, by yearend.

Nestlé, a big user of dairy ingredients for products ranging from kids' drinks and infant formula to chocolate, sees fermentation "as a very important part of helping to solve some of the challenges we have in sustainability," it said in a statement.

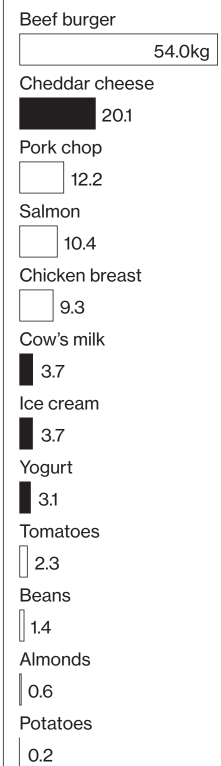
But one big milk product maker has had second thoughts about using the new type of dairy. General Mills Inc., maker of Häagen-Dazs and Yoplait, launched Bold Cultr in 2021, featuring a cream cheese alternative made with Perfect Day's protein. "The future of cheese is here," General Mills crowed in a statement introducing the brand. In February 2023, Bold Cultr said it was shutting down. General Mills declined to answer questions about the decision.

One challenge to adoption of the new faux dairy products is cost. While estimates vary about the price premium for precision-fermentation proteins, costs can range between parity and five times that of traditional dairy, depending on the consumer product, according to Vivici CEO Stephan van Sint Fiet. "We need to reduce our cost structure in order to make fermentation-derived proteins accessible to a broader audience," he says.

Success for animal-free dairy may hinge on the industry's ability to convince food and beverage companies that precision fermentation will help them meet their carbon reduction goals. Remilk's protein can cut greenhouse gas emissions by up to 95% compared with traditional dairy, says Wolff. Big food companies "can't just simply replace their entire animal-based materials with soybeans, almonds or cashews—the product will be different and consumers won't adopt in the same way," he says. "We can solve the sustainability part and also solve the quality issue." —*Bruce Einhorn, with Dasha Afanasieva*

THE BOTTOM LINE As consumer and investor interest in alternative protein companies wanes, some are pivoting to sell their products as ingredients for established foodmakers.

▼ Greenhouse gas emissions per kilogram of food production



DATA: CLARK ET AL. AS PUBLISHED IN *PNAS* IN 2022, COMPILED BY OUR WORLD IN DATA

In Ukraine, the humanitarian aid workers are not who you expect.



Liev Schreiber with a member of the Lviv National Philharmonic Orchestra. Since Russia's war in Ukraine began, the orchestra building has been serving as a distribution center for humanitarian aid, and its musicians spend hours each week unloading boxes of relief supplies from trucks.

"We're targeting organizations on the ground in Ukraine who are having the biggest impact—**we vet them, verify them and fast-track financial support to them.**"

Liev Schreiber
Actor, Producer, Screenwriter
Co-Founder, BlueCheck Ukraine

BlueCheck Ukraine

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2 TECHNOLOGY

Sorry, But LinkedIn Is Cool Now

The professional network is benefiting from social media upheavals elsewhere



ILLUSTRATION BY TENG MEU. REZVANI; COURTESY SELENA REZVANI

The biggest social media platforms all have their niches. Twitter is for arguing with strangers. Instagram is for showing off the best of your 500 selfies. Facebook is for learning too much about an acquaintance from college. And LinkedIn is for updating the obligatory professional profile when you're looking for a job, then receiving constant emails prompting you to congratulate someone on their "work anniversary."

Or at least that's how it used to be. As other networks stagnate, shift their algorithms or burn themselves to the ground, LinkedIn is becoming a site where regular people actually want to hang out and post their thoughts. It might even be cool.

LinkedIn, which Microsoft Corp. bought for $26.2 billion in 2016, doesn't report its number of daily or monthly average users, a common metric for usage on social media sites. But the company says that in the spring of this year, users shared 41% more content on the network than

Edited by Joshua Brustein and Mark Milian

they did in the same period in 2021. That kind of growth is unusual for a 20-year-old operation, and it speaks to the turbulence at other major social media services.

"Other social media platforms were changing their algorithms or operating rules," says Selena Rezvani, an influencer with 100,000 LinkedIn subscribers, who offers tips on how to be more confident. X, Elon Musk's new name for Twitter, is becoming a site that rewards those who either post memes or pay the billionaire $8 a month. Meta Platforms Inc.'s Instagram and Facebook, worried that TikTok is eating their lunch, have become all about Reels–short-form videos from people users aren't friends with, touting kitchen renovations and fitness hacks.

For social media users looking to engage in some old-fashioned self-promotional posting, LinkedIn is the only place left. "On Instagram or TikTok there's more frustration, because what worked more than a year ago, or even six months ago, that got success and got tons of eyeballs doesn't today," says Rezvani. "There's more of a steadiness with LinkedIn."

The shift is prompting cries of "Do I *have* to?" "Lost social media users are now congregating in the weirdest places," Kate Lindsay, an internet culture commentator, wrote in her newsletter, *Embedded*. When people started abandoning X, she wrote, they couldn't agree on whether to huddle around Bluesky, Mastodon, Threads or any of the numerous apps aiming to reinvent social media, dooming them to socialize in the same place where they "endorse" someone for leadership. "If you see me posting this on LinkedIn...mind your business," Lindsay added.

The ties to work do make LinkedIn more of a mainstay. Students and new grads have an incentive to try to use the site to get a job, even as they may have little reason to use X, which they associate with anger and political chaos. Those who are still using X note how strange it is to see vacation pictures and emotional stories on LinkedIn, including a halfhearted mention of something work-related–a supportive employer! A work-from-anywhere policy!–in case the boss sees.

Meanwhile, a generation that came of age posting about their lives on Instagram, Twitter and Facebook, building their identities with dispatches from weekends and nights out, are starting to see some utility in wishing one another a happy work anniversary. Over time they learned that, on the internet, everything they post ends up reflecting not just their personality but also their "personal brand." Writing earnestly on LinkedIn was once derided as awkward and professionally desperate–as in the 2017 "broetry" era, when the site's feed was populated by self-described gurus and growth hackers. Now, trying to become a so-called thinkfluencer seems strategic and at least marginally socially acceptable.

LinkedIn's product team is fueling the new vibe. In recent years it's added tools for newslettering, podcasting and creating video and audio for all its ambitious careerists, building on the influencer program that started in 2011 by training corporate leaders to post.

Unlike Instagram and Facebook, LinkedIn doesn't dramatically tweak its algorithm when new products go live. "We're totally agnostic about what media form people share," says Dan Roth, the site's editor-in-chief. And while Meta and X distance themselves from the news industry, downplaying article links, LinkedIn is beefing up its curation efforts and partnerships with content creators and publishers. The company says users like seeing "knowledge-based" content and, as a result, are more satisfied; in June the site saw an 80% reduction from a year earlier in the number of people who said they wished they were seeing different posts.

According to Roth, people became more comfortable posting about their personal lives during the pandemic, when many were blurring the lines between work and play while doing their jobs from home and balancing responsibilities such as child care. The pandemic was also an awakening for workers who realized they needed professional identities separate from their employers, to open the door to new financial opportunities and even side hustles.

"It's more common in Gen Z and millennials that they are willing to switch industries and switch roles than any previous generation," Roth says. "There's this constant demand to learn and to market themselves and talk about what they've learned."


● Rezvani

Rezvani's success led her to write a bestselling book about confidence. As the pandemic inspired people to switch roles at work or take on entirely new careers, posting started to seem more necessary, too. Companies where employment was famously stable and highly paid, such as Meta, Alphabet and Amazon, recently cut thousands of workers, including longtimers and managers. This gave them a fresh excuse to turn to LinkedIn, and perhaps even to append a green #opentowork badge to their profile pictures.

Public personal sharing on the other platforms is receding. Meta's fear of TikTok has altered not just the kind of content it prioritizes on its services–short video–but also the algorithmic priorities for its main feed: interests, not friends. Personal sharing has ▶

◀ moved to ephemeral or semiprivate spaces, such as Stories—posts that disappear within 24 hours—or direct messages.

Meanwhile, X has become entirely unpredictable. The company changes its rules based on the late-night whims of its new owner. At one point, Musk altered the algorithm so his own posts would be more popular; another time he limited his nonpaying users to seeing only 600 posts a day. The blue badge, which once stood for the verification of a well-established public figure on Twitter, now only means the user agreed to pay $8 a month.

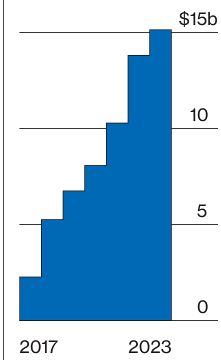
LinkedIn's business model relies on selling subscriptions to salespeople and recruiters looking to find partners or job candidates. This gives it a tendency toward stability, because it doesn't need to rely so heavily on the constant attention that helps ad-supported networks make money. The model seems to be working: LinkedIn's revenue rose to $15 billion in Microsoft's most recent fiscal year, almost triple what it had been five years earlier.

A knock on LinkedIn is that it's a never-ending stream of semi-personalized direct messages from cheery strangers angling for professional advantage. Such transparent self-promotion is preferable, perhaps, to the posturing that's common on services such as Instagram, where perfect curation is supposed to appear effortless and authentic. And most normal people would certainly prefer a bit of corporate blandness to the unsolicited hate, racism and harassment that's been on the rise on X since Musk loosened its content rules—the largest reason people cite for fleeing. You may not be your most interesting self at work, but at least you'll be on your best behavior.

"On LinkedIn you see people framing things with a little more tact when they disagree," Rezvani says. "Their employer might see it." —*Sarah Frier*

THE BOTTOM LINE People disillusioned with changes to other social networks are making a surprising shift to the Microsoft-owned platform for professional self-promotion.

▼ LinkedIn revenue by fiscal year



Deep-Sea Phishing

● Cybersecurity researchers fear deepfake video scams are on the verge of breaking out

Cybercriminals are constantly searching for new ways to trick people. One of the more recent additions to their arsenal was voice simulation software. In 2019 the chief executive officer of a British energy provider transferred €220,000 ($249,000) to a scammer after he received a call from what sounded like the head of the unit's German parent company asking him to wire money to a Hungarian supplier. The voice was generated using artificial intelligence, says Rüdiger Kirsch, a fraud expert at Euler Hermes, the energy company's insurer. (The insurer declined to identify the client but says it paid out the claim.)

Some cybersecurity experts have long feared what a hacker might be able to do with AI in video—create a convincing version of, say, a corporate executive who really wants to know your password. AI software is now capable of doing this practically in real time, meaning a hacker could pretend to be your boss on a Zoom call.

On Aug. 17 researchers at the Google-owned cybersecurity company Mandiant documented the first known instances of deepfake video technology designed and sold for phishing scams. Advertisements on hacker forums and Telegram channels in English and Russian boasted of the software's ability to replicate a person's likeness to make an attempted extortion, fraud or social engineering exercise "seem more personal in nature." The going rate is as little as $20 per minute, $250 for a full video or $200 for a training session.

The researchers were unable to confirm that the services they identified on hacker forums were legitimate or whether a deepfake has been used in any scam, but the threat of deepfake social engineering is real, says Luke McNamara, a principal analyst at Mandiant.

Udi Mokady, chairman of the information security company CyberArk Software Ltd., discovered recently how powerful these types of attacks could be. In a Microsoft Teams video message on July 20, Mokady found himself staring at a deepfake of himself. "I was shocked," he says. "There I was, crouched over in a hoodie with my office in the background."

The stunt was created by one of Mokady's own employees. Gal Zror, a vulnerability research ▶

DATA: COMPILED BY BLOOMBERG



▲ Mokady with his deepfake

PHOTOGRAPH BY PHILIP KEITH FOR BLOOMBERG BUSINESSWEEK

◀ manager at CyberArk, used free generative AI tools to re-create Mokady's image. Zror's initial goal was to see what was possible, and that quickly morphed into a warning for his bosses.

Zror's first stop for his extracurricular project was an online forum popular with deepfake pornographers. There he collected tips on real-time deepfake tools. He learned that a computer with powerful graphics processors such as those made by Nvidia Corp. was essential. He also needed lots of data to train the deepfake tool, which he found in the form of recorded earnings calls, video presentations and photos of CyberArk's chairman.

Once he had his Mokady deepfake, Zror tested its limitations. Masquerading as Mokady, Zror found that if he used words with long vowels, it sounded a little off. He didn't think it was too much of a problem, though. "Since we all got used to bad audio and video quality on virtual calls," Zror says, "it's still good enough to deliver a dangerous social engineering attack." The project took several days to complete, he says, and a nontechnical person with access to some good computing power could probably do it within weeks.

Zror presented his work at the Def Con hacker conference in Las Vegas on Aug. 11. The crowd applauded when he transformed himself into the conference organizer, the renowned hacker Jeff Moss, live on screen.

Zror never tried to deceive his co-workers with the deepfake. Mokady figures that everyone at CyberArk, which has about 2,800 employees, was pretty tech-savvy and had enough access to him that they'd be able to spot a fake. "If we were the size of an IBM or a Walmart or almost any Fortune 500 company," he says, there'd be legitimate cause for concern. "Maybe Employee No. 30,005 could be tricked." —*Margi Murphy*

THE BOTTOM LINE Although there's no evidence an AI-generated video has been used in a scam, it's now technically possible, and researchers have observed the tools being advertised to hackers.

Fund Managers Aren't Stupid. The Market's *Skewed*

● When a handful of stocks account for the vast majority of gains, it's tough to outperform

Consider two assertions about the much-maligned stockpicking industry.

First: Only 1 in 3 active managers can beat an almost free fund tracking the S&P 500. Second: Active managers taken together possess discernible investing skill. According to Hendrik Bessembinder, the Arizona State University professor whose research has upended much accepted wisdom about investing, both are true.

How that can be so goes back to the paper that's made him an academic lightning rod in one of the most fraught debates on Wall Street. To him, the case against active management has nothing to do with the world's best-paid professional investors being the equivalent of dart-throwing monkeys or pawing cats.

Rather, the thing that condemns the vast majority of stockpickers to futility is the market's own obscure math. It's a statistical concept known as skewness, on vivid display this year. "It's kind of hard to make the argument that fund managers are just systematically stupid," Bessembinder says from his office at the W.P. Carey School of Business in Tempe, Arizona.

His best-known finding concerns the lopsided nature of market returns: Gains in only 72 companies have accounted for half of all net wealth creation from stocks, relative to Treasury bills, since 1926. In other words, the frequently lamented narrowness of the market—in recent years characterized by, take your pick, FANG, FAANG, FAATMAN and the like—is a permanent feature of investing. The reason is skewness, a term that means there are big outliers in a distribution of outcomes.

Skewness leads to a nearly insurmountable problem for the larger population of mutual fund managers. Effectively, it creates something resembling a scarcity of stocks upon which outperformance can be built. With most stocks falling short of benchmarks, so do the funds that own them. "It's hardwired that there will be skewness, and when there is skewness, you're going to have the majority of the outcomes below the average outcome," Bessembinder says.

This effect has been especially large in 2023, even for a market that's been used to Big Tech dominance since the global financial crisis. The 20 largest

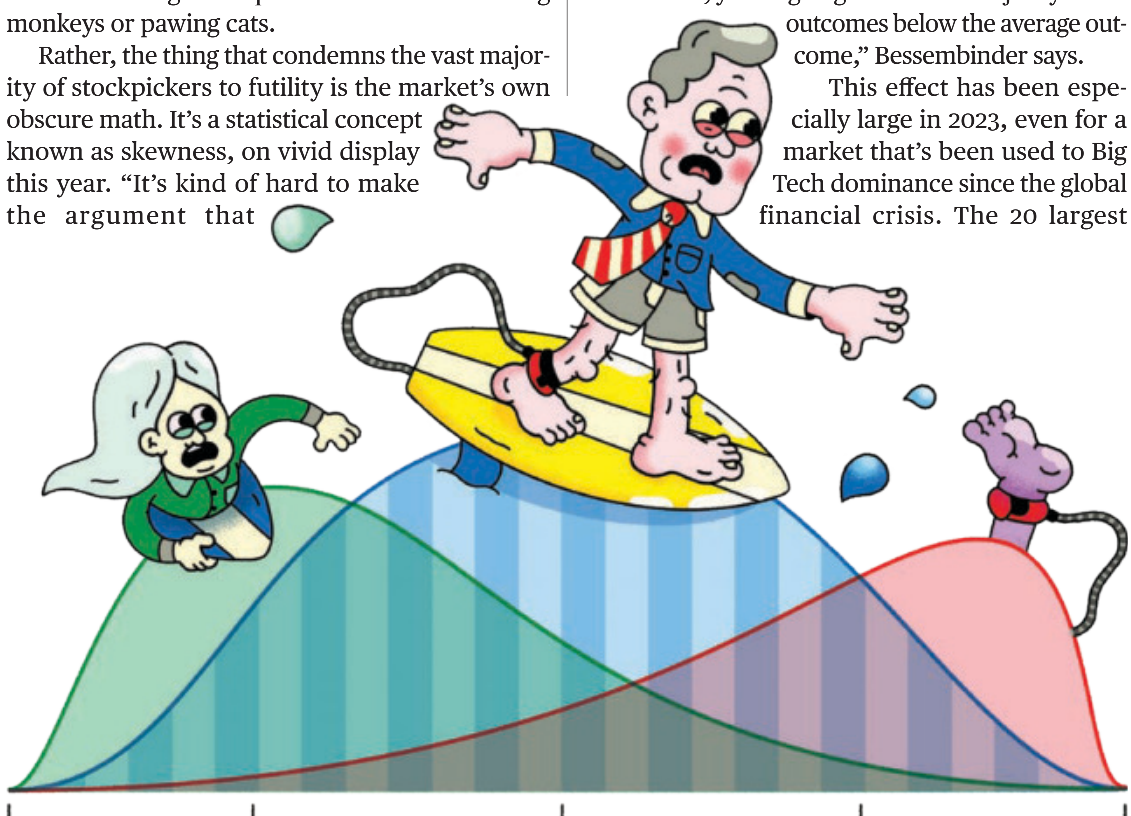


ILLUSTRATION BY HUNTER FRENCH. BESSEMBINDER: PHOTOGRAPH BY CHONA KASINGER FOR BLOOMBERG BUSINESSWEEK

Edited by Eric Gelman

stocks are contributing the most to index returns in almost three decades, JPMorgan Chase & Co. strategists wrote in July. About 70% of the stocks in the S&P 500 lagged the index in the first half of the year, the most for a six-month period since 1999, data compiled by Bloomberg show.

Predictably, this year's scarcity of winning stocks—usually attributed to the narrow beneficiaries of the artificial intelligence boom—has led to a lean season for winning funds. Only 36% of US mutual funds that invest in large-cap stocks beat their benchmarks through July, Bank of America Corp. strategist Savita Subramanian wrote in a note in August.

According to S&P Global Inc.'s research spanning two decades, more active managers beat their benchmarks in years when the largest stocks lagged the index. "The likelihood that most managers were overweight the mega-caps is pretty small," says Craig Lazzara, managing director at S&P Dow Jones Indices. "Most active portfolios are far closer to equal-weight."

New research by Bessembinder, co-authored with Michael Cooper at the University of Utah and Feng Zhang at Southern Methodist University, shows how pervasive this effect is over time. Out of 7,883 US mutual funds going back to 1991, just 41% beat the S&P 500 exchange-traded fund each calendar year, while only 30% did so across three decades, the trio wrote in "Mutual Fund Performance at Long Horizons," in the *Journal of Financial Economics*. (Those percentages are higher than what's commonly reported because the paper compares active funds with actual index funds, which incur trading costs and expenses, rather than theoretical benchmarks.)

A conventional interpretation of those data might be that stockpicking is a racket, with any claim of investing prowess likely an illusion. And the work certainly fortifies the case for passive management: Particularly given fees, owning an index fund looks like a better bet than ever in light of the research. What it doesn't do, however, is prove that mutual fund managers don't know what they're doing. Just as stocks spit out a precious few superstars to heavily burnish the performance of indexes, so does the money management industry.

Bessembinder's paper shows the aggregate performance of all mutual funds versus the S&P 500 ETF over time. By his calculations, actively managed stock funds have returned 294% over their lifetime, more or less matching the S&P 500—while the median fund posted only 95%. In other words, the superstars did the heavy lifting. Out of the entire sample, 442 delivered returns more than twice as large as the SPY—the largest ETF that tracks the S&P 500 index—and 106 posted three times that. (Before fees, a purer way to gauge skill, they posted 394% on average.)

In some respects, this makes sense. Because the universe of active funds is big enough to own all stocks, their performance will logically come close to that of the market itself. The way rewards are apportioned among managers—unfairly, by the laws of skew—creates a backdrop where ridiculing high-priced investors for their inability to keep up with a preprogrammed index becomes a trifle too easy.



▲ Bessembinder

"Once you realize the long-run returns are skewed, you realize that the upside is much bigger than you would've otherwise thought it was," Bessembinder says. "That's what a percentage of active managers take as inspiration."

The skewness captured in his blockbuster paper in 2018 is so extreme because it spans the entire US market across many decades, and some have said its conclusions are sensationalized. But it's also won some key patrons. Baillie Gifford, the Scottish company with $293 billion under management, hired the professor as a consultant ▶

◀ after that paper, which he says supported the company's instinct for making big bets.

Today, skewness might be down to the winner-take-all nature of dominant sectors such as tech. By that logic, market concentration—and hence the hurdle for stockpickers—might only get worse, as Bessembinder has found it doing in recent years.

But it's also partly a result of the long-term and dully mathematical effects of market swings: If a stock (or a fund) goes up 10% one month and then down 10%, it's still down 1%. If it goes down 10%, then up the same amount, it's also down 1%. But if it posts two consecutive months of 10% gains, it's up 21%. That's why the winners tend to widen their leads over time.

Two financial data scientists, Maxime and Vladimir Markov, calculated exactly how dependent global stock markets were on their biggest winners from 2006 to 2021. They found that small-cap indexes were more dependent than large caps, tech much more so than other industries. But the S&P 500 is also more skewed than European and Japanese large-cap benchmarks, according to their paper, which was a personal project posted online this year. (Vladimir Markov is an employee of Bloomberg LP, the parent of *Bloomberg Businessweek*.)

To Lazzara at S&P, this kind of math is why active managers are better off with a broad portfolio that takes out, say, 50 of their least favorite names, rather than wagers on the 50 they like best.

Martijn Cremers, a finance professor at the University of Notre Dame, who's consulted for active managers, agrees with Bessembinder's findings. "It's only a smaller proportion of the assets that will be responsible for most of the outperformance, and that means that to be successful as an active manager in that environment, you have to be more concentrated," he says. "It requires also more courage, stronger conviction." —*Justina Lee*

THE BOTTOM LINE With a relative handful of stocks responsible for driving the market, managers have to focus heavily on winners if they want to beat the benchmarks.

Midsize Banks Struggle In No Man's Land

● Higher interest rates and new regulations keep the pressure on lenders below the top tier

This hasn't been a good year for banks. Since March, four with assets of greater than $1 billion have collapsed, billions in deposits have migrated out of bank accounts into higher-yielding alternatives, and regulators have unveiled sweeping new rules that could reduce the amount of money they have available for lending.

Although the largest institutions were able to shrug off the worst of the turmoil, midsize ones—roughly speaking, those with $85 billion to $250 billion in assets—are still grappling with the problems that touched off the panic earlier this year. And regulators have signaled that they will be subject to stricter rules in the near future. Some analysts are voicing concerns about their place in the banking ecosystem. "It's kind of no man's land," says Brandon King, an analyst with Truist Securities. "You're not big enough to be a money center bank, where you can have this massive scale, mature businesses, that you don't have to solely rely on spread income, like JPMorgan or Bank of America or Wells Fargo."

On Aug. 21, S&P Global Ratings downgraded the debt of KeyCorp, Comerica and three other regional banks, citing a decline in deposits, the impact of higher rates and other pressures making life "tough" for them. The move came two weeks after an unexpected slate of ratings actions on 27 US banks taken by Moody's Investors Service Inc., which cited factors that will continue to dog the sector: higher funding costs, weaker profitability, capital levels that lag their

RUARID STEWART/ZUMA PRESS/ALAMY. DATA: FEDERAL RESERVE

US Bank Size

Number of US-chartered commercial banks with assets of $300m or more, by assets





◀ The CEO of Zions has cited the high cost of deposits as a challenge for the bank

largest Wall Street counterparts and risks linked to commercial real estate lending.

Zions Bancorporation NA Chief Executive Officer Harris Simmons described the challenges when his company—the 32nd-largest lender in the US, with about $88.6 billion in assets as of March 31—reported results in July. “While deposit attrition appears to have been largely transitory, the higher cost of deposits remain,” he said on a conference call with analysts. His comments were specific to his institution but captured the broader industry’s predicament.

High interest rates and funding pressures won’t last forever, but other challenges will linger. In late July the US Federal Reserve and other bank regulators unveiled plans to impose tougher capital requirements, forcing banks to set aside more money to cushion unexpected losses. The plan would subject midsize companies such as Huntington Bancshares, KeyCorp and Regions Financial to the kind of stringent requirements previously reserved for the largest lenders.

“The further away you get from $100 billion, the better scale, the better profitability you’ll have,” says David Konrad, an analyst with KBW. The $85 billion to $150 billion asset range is the most problematic for lenders, “because you’re straddling that new threshold with more regulatory requirements,” he says. By comparison, the four largest US banks all have more than $1 trillion in assets.

Rivals outside the banking sector see an opportunity in the struggles of midsize banks. Private credit firms—which function like private equity shops but lend to companies instead of buying them—are stepping up their participation in the world of consumer finance. They’re buying loans from banks at a discount and building up war chests in anticipation of more sales. “Banks are pulling out,” says Gal Krubiner, CEO of Pagaya Technologies Ltd. “Asset managers are pulling in.”

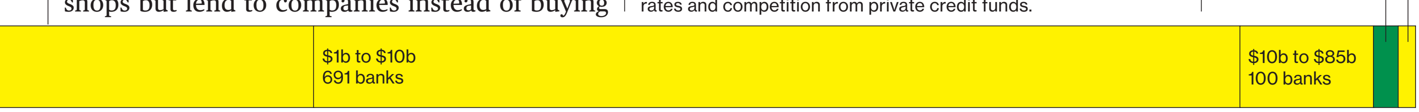
Private credit is also putting cash to work lending to medium-size companies, a business that regional banks once dominated. The trend is likely to continue, because the new capital rules will force banks to take a more conservative approach to lending. JPMorgan Chase & Co. CEO Jamie Dimon said during an earnings call in July that the new rules would have the Blackstones and the Apollos of the world “dancing in the streets,” because they’re not subject to them and can lend freely.

For some banks, private credit funds are a source of business as well as competition. “The private debt funds are important to us,” says Donald McCree, head of commercial banking at Citizens Financial Group Inc., which has more than $221 billion in assets. “They’re not only competitors to us, they’re also customers of ours.”

McCree still considers banks such as Citizens to be a crucial part of the economy: “The regional banks play a very important role in Main Street America. We’re the lenders and bankers to enormous numbers of midsized companies, which are critically important to the economy.” —*Max Reyes and Bre Bradham*

THE BOTTOM LINE Banks that are a crucial source of lending for medium-size companies are most vulnerable to higher interest rates and competition from private credit funds.

“The further away you get from $100 billion, the better scale, the better profitability you’ll have”





How Much Debt Is Too Much Debt?

● A new era of bumper-size US deficits has consequences for investors and borrowers

American politicians are keener than ever to juice the economy with government cash, a shift that's already helping to drive up US borrowing costs and looks likely to keep them high long after the inflation emergency is over.

The outlook for the federal budget right now is essentially unprecedented—crisis-size deficits as far as the eye can see, even though the economy appears to be in good health. That prospect is making investors uneasy, as demonstrated by yields on benchmark 10-year Treasuries climbing above 4.3% this month, their highest level since 2007.

Wall Street has been grousing about Washington's spending habits forever, but there's a new twist underlying the bond market angst. This year's surge in the deficit—which more than doubled, to $1.6 trillion, in the 10 months through July—looks like what happens when the government goes into recession-fighting mode. Except right now the economy is growing at a decent clip, so far confounding expectations for a downturn this year.

And the extra-large cash infusion is not a one-time aberration. From Donald Trump's tax cuts to President Joe Biden's industrial subsidies, not to mention the multitrillion-dollar pandemic rescue,

Edited by Cristina Lindblad

ILLUSTRATION BY MARTIN GROCH. DATA: COMPILED BY BLOOMBERG; CONGRESSIONAL BUDGET OFFICE

both Democrats and Republicans are increasingly ready to use the public purse to rev up growth rather than entrusting the job mainly to the Federal Reserve. So the prospects for a big, bipartisan deficit-reducing deal anytime soon appear slim.

"You have a tremendous amount of fiscal spending–an unprecedented amount in non-war times. There are a lot of factors coming together to push long-end rates higher," says Oksana Aronov, head of market strategy for alternative fixed income at J.P. Morgan Asset Management.

The consequences stretch beyond the $25 trillion Treasury market. Rising yields on US government debt are making home loans more expensive: The average rate on a 30-year fixed mortgage recently climbed above 7% for the first time in more than two decades. Stocks may also suffer, since higher financing costs for corporations eat into profits. "History tells us that no asset class is really going to escape this entirely," Aronov says.

The main reason everyone's paying more to borrow now is that the Fed has been ratcheting up interest rates for a year and a half to quell inflation. The conventional wisdom is that the most rapid cycle of monetary tightening in four decades is near an end, though Fed Chair Jerome Powell could upend that assumption when he addresses fellow central bankers at the annual Jackson Hole conference in Wyoming on Aug. 25.

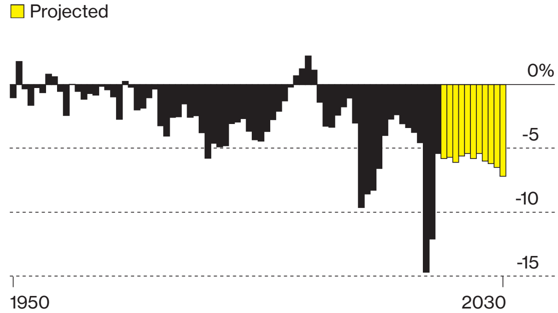
Some economists warn that the hundreds of billions of dollars the Biden administration is pouring into programs to bolster domestic manufacturing of electric cars and semiconductors, as well as the large sums being doled out for infrastructure improvements, could rekindle inflation and make it hard for the Fed to dial back its rate hikes.

In Washington, lawmakers fresh from this spring's debt ceiling showdown are headed for another spending battle, this time over budget plans for the coming fiscal year. The amount under dispute is just $100 billion, chump change compared with the trillions in spending cuts and tax increases that analysts say would be needed to stabilize the national debt. While noisy battles get fought over the relatively small part of the budget that funds domestic agencies, lawmakers from both parties are loath to pare back Social Security payments or health benefits for retirees. Nor do they want to pay the political price of raising the tax burden on households and businesses.

The upshot is that the nonpartisan Congressional Budget Office expects the deficit to expand to roughly 6% of gross domestic product this year–and to stay in that ballpark for the

Deficits as Far as the Eye Can See

US budget balance as share of GDP



DATA: CONGRESSIONAL BUDGET OFFICE, OFFICE OF MANAGEMENT AND BUDGET

next 10 years. For context, in the six decades or so between the aftermath of World War II and the 2008 crash, the shortfall never reached that level.

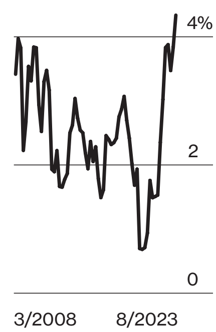
What's changed is that fiscal policy is being used as a tool to prolong expansions and keep the economy humming, according to Doug Holtz-Eakin, a former CBO director who heads the American Action Forum, a Republican-leaning think tank. "During the 1980s and 1990s there was more of a focus on the long-term picture and making sure our fiscal house is in order," he says. "And they let the Fed take responsibility for the business cycle."

One consequence of the slow and grinding recovery that followed the 2008 financial crisis is that US politicians learned there's a political cost to delegating economic management to the central bank. Trump boasted that his tax cuts accelerated growth, while Biden is trumpeting America's high-speed rebound from the Covid-19 slump, now getting a second wind thanks to incentives in the Inflation Reduction Act and the CHIPS legislation. Both presidents ducked complaints that such policies would pave the way for bigger deficits or feed into inflation.

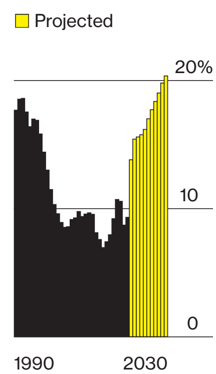
A generation of traders has gotten used to bond yields that declined regardless of what happened to government budgets. Expect the historic correlation between those two variables to reassert itself, says Wall Street veteran John Ryding, chief economic adviser at Brean Capital. His back-of-the-envelope prediction is that each percentage-point increase in the federal budget deficit as a share of GDP will cause a 40-basis-point increase in 10-year Treasury yields.

Monetary and fiscal policies are intertwined in another important way, too: The government's debt service costs are soaring as a result of the Fed's rate hikes. Net interest payments on federal debt have surged above $600 billion a year, from around $380 billion when the pandemic ▶

▼ Nominal yield on 10-year US Treasuries



▼ Net interest on debt as share of federal revenue



◀ hit. They now gobble up about 14% of tax revenue, a level that in the past spurred investors and Congress itself to demand more fiscal discipline, says Brian Rehling, head of global fixed-income strategy at Wells Fargo Investment Institute. "Having more and more of your revenue consumed simply to pay your debt servicing costs to bondholders is not a very productive use of capital," he says. "Investors should take it seriously."

Maturities on Treasuries have gotten shorter in recent years, so that almost one-third of the whole national debt needs to be rolled over within the next 12 months—likely at the new higher rates. And that doesn't take into account additional issuance to finance larger deficits. In the current quarter, net borrowing is coming in at $1 trillion.

After adding up the debt arithmetic and political deadlock, Fitch knocked the grade on US sovereign debt down one level from AAA to AA+ on Aug. 1, predicting the country's finances will likely deteriorate over the next three years and citing an "erosion of governance."

Mind you, these dynamics are not uniquely American. In a report this month, Ariane Curtis at Capital Economics found that most large advanced economies will also have higher debt ratios in five years' time than they did in 2019. "Policy looks set to remain more supportive of demand than it had been," she wrote. "If deficits remain permanently larger, then long-term interest rates may need to remain higher as well."

For all the hand-wringing, it's hard to map out a path that leads to a full-blown bond meltdown in the US, like the ones that threatened European economies last decade and are commonplace in emerging markets such as Argentina.

Not only does the US borrow in its own currency, giving it the ability to print more money in a pinch, but Treasuries—despite what ratings companies say—still represent the strongest of global safe haven assets, which ensures that demand for them will remain robust until an attractive alternative materializes. Also, economists have been raising the alarm over the level of US debt for decades, arguably undermining their case with vague and premature warnings of doom.

"It's not clear at all that we can identify in advance a particular level of federal debt that would trigger a crisis," says Karen Dynan, an economics professor at Harvard. "There's no consensus among experts." *—Liz Capo McCormick, Erik Wasson, Christopher Condon and Alexandre Tanzi*

THE BOTTOM LINE US politicians' willingness to spend big even when the economy is healthy will keep interest rates elevated long after the Fed has vanquished inflation.

Iowa's GOP Walks a Fine Line on Immigration

● The state's Republican officials are pushing for more foreign-born workers as businesses struggle to fill openings

With an unemployment rate of just 2.7%, below the US average, Iowa has what its lawmakers and businesses see as an urgent problem: It needs more workers. That labor shortage has put some of the state's Republican officials and legislators on a political tightrope, with many voicing a need for immigration reform to ease the hiring crunch at home while not straying too far from the national party line, which has generally prioritized the goal of restricting unauthorized immigration over that of expanding pathways for achieving legal status.

The balancing act is poised to get even more difficult as the GOP presidential candidates ramp up campaigning in the state ahead of its first-in-the-nation caucus in January, courting voters with pledges to tighten control of the country's southern border. Their messaging could deepen a rift in Iowa's GOP electorate, with business-minded, traditional Republicans advocating for raising the number of foreign-born workers the US admits and others embracing former President Donald Trump's more nativist stance.

● Iowa's unemployment rate in July

2.7%

State Senator Mike Bousselot, a Republican in Polk County, hits both notes when asked if immigration reform is needed to address the hiring squeeze. "First and foremost we need to secure our border," he says. "Beyond that we need to make sure we have a pathway for people to legally immigrate and that we're bringing great people into this country to go fill jobs."

The fate of a recent proposal at the statehouse underscores the tension in a state that's increasingly a Republican stronghold. Senator Julian Garrett of Warren County sponsored a bill that would mandate the use of E-Verify, a platform that allows employers to check documents provided by new hires to confirm they're authorized to work in the US. The plan reflects the national GOP's priority of cracking down on illegal immigration and mirrors a similar law that recently came into effect in Florida.

Several local business groups in Iowa have opposed the bill. One opponent, Joe Murphy, president of the Iowa Business Council, says what's needed is a comprehensive revamp of federal

RACHEL MUMMEY/BLOOMBERG

immigration laws rather than a state-by-state patchwork of rules. "It's border security, it's E-Verify, it's visa quotas, it's visa expansion," he says. "All of those things in totality."

Foreign-born workers have helped ease some pandemic-induced shortages—they accounted for 60% of the increase in the nation's labor force last year. Overall, immigrants represent just under 1 in 5 US workers. In the Midwest, which includes Iowa, their share is smaller, at 10%.

Hiring difficulties in Iowa have forced companies in labor-intensive industries to adapt. Dee Zee, a maker of auto parts and accessories that has its headquarters in Des Moines and seven manufacturing facilities in the state, has raised its base pay while it seeks to add to its workforce of 1,000. It has about 60 openings. "We're really having a focused HR campaign due to our shortage of workers," says human resources director Kerri Minor.

Dee Zee's success may depend on its ability to reach foreign-born workers: A majority of its factory workers speak English as a second language, and the company has hired immigrants and refugees from places including Afghanistan and Vietnam. "You come here and you have nothing but those suitcases you're coming with," says Amela Secerbegovic, a Dee Zee employee who came to the US in 2002 from Bosnia and Herzegovina. "So you're kind of willing to start working right away and get something for your kids. Thank God, my cousin heard about this company."

Dee Zee relies on family referrals and word-of-mouth to attract job applicants. That approach reflects a federal immigration system that prioritizes the reunification of families over the needs of employers. "The federal structure for legal immigration in the US has no basis in worker demand," says Theresa Cardinal Brown, senior adviser for immigration and border policy at the Bipartisan Policy Center.

Tyson Foods, which has eight facilities in Iowa and faces a persistent need for meat-processing labor, has built a workforce in the US that includes 42,000 immigrants and refugees from 160 countries; 11,000 of them work in Iowa. Tyson has advocated for legislative efforts that address comprehensive immigration reform and partners with Immigrant Connection, a nonprofit providing workers with access to immigration legal services. "One of the few sources available to replenish those populations of front-line workers are immigrants and refugees," says Garrett Dolan, Tyson's senior manager for corporate social responsibility.

Republican Mayor Tiffany O'Donnell of Cedar Rapids uses the word "broken" to describe the immigration system. "We can put a man on the moon, but we can't figure out how to connect someone in Central America to the thousands of jobs we have in this state," she says.



▲ Secerbegovic (right) at Dee Zee's main plant in Des Moines

There's only so much officials can do at a regional level, because federal authorities set immigration rules. Bob Scott, a businessman who is Sioux City's longtime nonpartisan mayor, says he's tried to nudge lawmakers on Capitol Hill into action. "When I talk to our congressmen," he says, "I tell them workforce is a problem and immigration is one of the solutions that they need to work towards."

He has little confidence that Congress will take up immigration reform, despite what he sees as good reason for bipartisan engagement. "One party wants the votes, and the other party wants the labor, and it would seem like somewhere in the middle there you could find a consensus to solve these problems," Scott says.

"We can put a man on the moon, but we can't figure out how to connect someone in Central America to the thousands of jobs we have in this state"

Calls to action are bound to run into even more resistance as the 2024 election draws closer and officials hew closely to national party talking points.

At the Iowa State Fair this month, some potential voters argued that the emphasis should be on pulling more Americans into the workforce rather than expanding immigration. Vee Sell, a 63-year-old housewife from Cedar Falls, said she was worried about the labor shortage in the state but didn't think embracing an open border was the right answer. "Immigration is immigration, workforce is workforce—you've got to tell your citizens, 'You've got to go to work,'" she said. —*Hannah Pedone, with Augusta Saraiva, Isis Almeida and Stephanie Lai*

THE BOTTOM LINE Concerned that a tight labor market will cap growth, Republican officials in Iowa are calling for immigration reform while at the same time enacting tighter controls.



Some founders possess the capacity and drive to do exceptional things. Bloomberg New Economy's 2023 class of Catalysts is a remarkable group of 20 people who are creating more equitable, inclusive, and sustainable outcomes.

Meet the 2023 class at
BloombergNewEconomy.com/Catalysts

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THE BLOOMBERG NEW ECONOMY CATALYSTS

It takes a special kind of person to change the world. Bloomberg New Economy's 2023 class of Catalysts recognizes 20 such people—talented individuals who've envisioned more equitable, inclusive and sustainable outcomes and demonstrated the drive and tenacity to achieve them. These pioneers in the new economy are solving intractable problems such as subpar schooling in developing countries, the difficulties of financing startups in poor communities and outdated agricultural methods that contribute to global warming. They show how courage and determination, combined with cutting-edge technology, can help heal a world imperiled by climate change and riven by vast divides in wealth, education and quality of life. And that's worth celebrating.
—*Erik Schatzker*

Profiles by Laura Bolt
Illustrations by Luis Mazón

MARINA BELINTANI



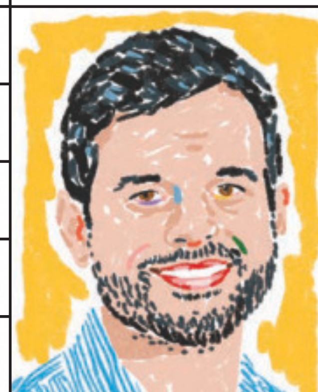
BRAZIL

Co-founder and chief technology officer of Mabe Bio

● Creating plant-based biodegradable leather products for a more sustainable wardrobe

The fashion business in Brazil is booming, and the production of leather plays a big role in that growth. But there's an environmental cost: As much as 80% of clothing's carbon footprint comes from the production of materials, and leather is seven times worse for the climate than synthetic alternatives, according to advocacy group Collective Fashion Justice. Most fake leather, though, is made of plastic. Designer Marina Belintani wanted a greener option, so she came up with a biodegradable, plant-based alternative made from angico trees.

FELIPE CARDOSO



BRAZIL

Founder and CEO of Eco Panplas

● Curbing water pollution from industrial lubricants with a novel approach to recycling

Industrial lubricants are essential to manufacturing, ensuring the smooth and efficient movement of machines to reduce friction and wear. But discarded plastic containers containing residual lubricants can wreak havoc on the environment. In Felipe Cardoso's native Brazil, 1 billion such containers are thrown out every year, and just 1 liter of lubricant can contaminate as much as 1 million liters of water, the World Intellectual Property Organization estimates. In 2017, Cardoso's Eco Panplas started to tackle the issue. The company says its recycling process can remove traces of lubricating oil from bottles with a biodegradable degreaser—and no water—at 30% of the cost of other methods. It recycled 1,200 tons of lubricant packaging in 2022 and aims to increase that to as much as 15,000 tons annually by 2026.

MANU CHOPRA

Co-founder and CEO of Karya

INDIA



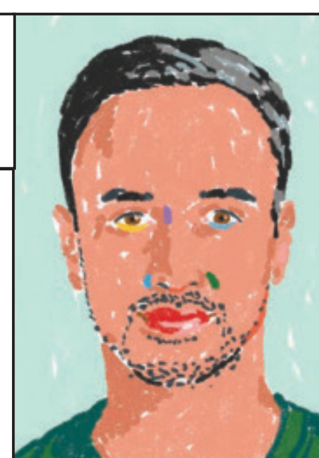
● Lifting rural Indians out of poverty with crowdsourced digital employment opportunities

Annual data generation is worth $100 billion globally, but the digital workers driving the industry don't see much of the benefit, with Indians in the field typically earning only $1 a day. After discovering that Indian-language data sets were being sold at as much as 200 times the cost of collecting the information, Manu Chopra co-founded the nonprofit Karya to provide ethical digital work to rural Indians. Using crowdsourcing, it offers job opportunities to people in the countryside who compile local-language speech data sets, document digitization, and image annotation and labeling. Karya says it pays well over the minimum wage—at least $5 an hour—and that 30,000 workers have completed tasks on its platform.

SHAHIR CHOWDHURY

Founder and CEO of Shikho

BANGLADESH



● Democratizing the Bangladeshi education system through game-based learning

Only about 80,000 of the 45 million school-age children in Bangladesh speak English, limiting their access to quality education, which is typically delivered in that tongue. To serve the millions who don't, Shahir Chowdhury founded Shikho, which created a digital learning system in the Bangla language. Shikho's content involves gamification techniques such as points, leaderboards and virtual awards to make daily lessons, homework, exam prep, tutoring and skills development more engaging. The company says it has 1.7 million registered users, and Shikho is working on new offerings such as live lessons, tools for parents and materials for university students and adults.

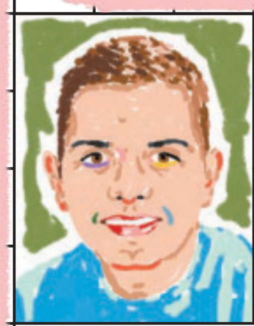
MARIANA COSTA CHECA

Co-founder and president of Laboratoria | PERU



● Bridging the gender gap in the Peruvian tech industry

When Mariana Costa Checa returned to Lima after studying at the London School of Economics and Columbia University, she was dismayed to discover that women make up less than 10% of the Peruvian technology industry. That's not just an issue for women but also for the economy, as Latin America will need 3.5 million professionals in science, technology, engineering and mathematics by 2025, recruiter PageGroup predicts. To fill the gap, Costa Checa started Laboratoria, a nonprofit that offers training boot camps for women and helps match candidates' talents with open jobs. More than 3,300 women have completed Laboratoria's programs in Brazil, Chile, Colombia, Mexico and Peru, and about 85% of those have landed jobs in the past two years. With additional funding from Google, the group has created a new initiative, Laboratoria+, to offer continuing education for working professionals.



ALFONSO DE LOS RÍOS

Co-founder and CEO of Nowports | MEXICO

● Reducing supply chain bottlenecks in Latin America with AI tools and innovative financing

After the Covid-19 pandemic created supply chain challenges, some US companies sought to reduce shipping time and avoid bottlenecks by relocating manufacturing closer to home. The trend has benefited Mexico, where exports in March reached a record $53.6 billion, in large part because of US demand. Alfonso de los Ríos says his digital freight forwarding company, Nowports, can ensure the smooth delivery of goods from Latin America. The company uses automation and artificial intelligence to speed transactions, including an inventory financing tool that allows companies to acquire merchandise and pay for it later. The startup now has 10 active offices in Latin America.



GUY HUDSON

Co-founder and CEO of Loam Bio | AUSTRALIA

● Using microbes in soil to help farmers reduce carbon emissions and improve yields

Agriculture accounted for 11.2% of US greenhouse gas emissions in 2020. To help reduce the release of those gases, Guy Hudson started Loam Bio, which has developed microorganisms that trap carbon in soil. Loam sells a fungus that creates so-called microaggregates capable of storing twice as much carbon as other techniques. The method does double duty, keeping CO_2 out of the atmosphere while making soil healthier, which boosts yields for farmers.

CLAUDIA KOLONAS

INDONESIA

Co-founder of Pluang



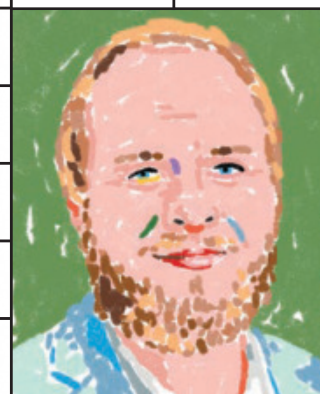
- Helping Indonesians diversify their investments and increase financial literacy through an app

Indonesians scored only 38% in the country's latest assessment of financial literacy, and less than half the population have formal savings accounts. Investment adviser Claudia Kolonas says her app, Pluang, can help on both counts. It aims to give Indonesians access to microsavings and microinvesting accounts and to financial education through their smartphones. The app, which has more than 3.5 million users, facilitates investments as small as 50¢ in gold, indexes, mutual funds and crypto assets.

FILIP LÖVSTRÖM

KENYA

Co-founder and CEO of Roam



- Electrifying transport in Africa with affordable and eco-friendly vehicles

Motorcycle taxis offer indispensable transportation for Kenyans, but they're an air-quality menace in a country where pollution caused more than 5,000 premature deaths in 2019, according to the State of Global Air report. Filip Lövström says it's time to take transport in Kenya electric. Roam, the company he co-founded, has developed electric bikes, designed in Sweden and manufactured in Nairobi, that it says are cleaner and 60% cheaper to drive than today's gasoline-powered cycles. And last year, the company introduced an electric bus it calls Roam Rapid. The startup has become Africa's leading provider of electric vehicles, aiming to produce more than 50,000 e-motorbikes annually at the Nairobi factory it opened this year.

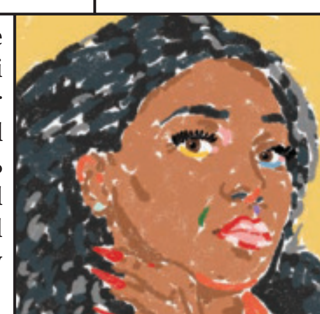
CHARLOT MAGAYI

Founder of Mukuru Clean Stoves

KENYA

- Empowering women, saving lives and reducing pollution with safer stoves

After her young daughter suffered a severe burn from an open cooking fire, Charlot Magayi sought a safer way to prepare meals for her family. She introduced Mukuru Clean Stoves, which sells containers made of recycled metal that burn a biomass material of charcoal, wood and sugar cane. She says the stoves create 90% less pollution than an open fire running on wood and charcoal and 70% less than a traditional cookstove fueled by kerosene or agricultural waste. Mukuru, which relies on a network of local women as sales agents, has sold about 200,000 units in Kenya at $10 apiece, which the company says has saved customers $10 million in fuel costs.



VIDYUT MOHAN



INDIA

Co-founder and CEO of Takachar

- Cleaning the air by converting agricultural waste into valuable biofuels

Globally each year, 92 million metric tons of crop and forest waste—stems, leaves, manure and other farming byproducts—are burned in the open, according to India's Ministry of Agriculture and Farmers Welfare. It's an environmentally disastrous process that spreads smoke and other pollutants both locally and far afield. Vidyut Mohan's company, Takachar, has developed equipment that attaches to tractors to convert field waste into biofuels and fertilizer. Those products can then be either used by the farmers themselves or sold locally, avoiding 95% of the pollution from fires and helping farmers earn some extra cash.

PELONOMI MOILOA



SOUTH AFRICA

Co-founder and CEO of Lelapa AI

- Using African-made artificial intelligence models to solve Africa-specific problems

As the tech sector gushes about artificial intelligence, developing countries risk being left out. Although Africa is home to about one-third of the planet's languages, 95% of those have yet to be connected with the global market through voice and text technology, according to Pelonomi Moiloa. She is the co-founder of Lelapa AI, a lab that offers AI-powered language models to support African businesses and nonprofits by providing digital tools in underrepresented tongues. Moiloa aims to use these models in areas such as increasing access to health care and improving yields for farmers by predicting the spread of crop disease or soil nutrient deficiencies. Moiloa says robust AI opportunities can bring tech talent back to Africa, making the region more attractive to programmers and developers.

HILDA MORAA

Founder and CEO of Pezesha | KENYA



● Helping African businesses grow by using technology to bridge the funding gap

Hilda Moraa says her digital lending platform, Pezesha, can help entrepreneurs across Africa who struggle to raise money for their companies. It connects banks, microfinancing groups and other financial institutions with businesses in need of funding. The company says its credit assessment algorithm, called Patascore, has helped disburse more than 200,000 loans to businesses in Ghana, Kenya and Uganda—at least half of them led by women.

AMINATH SHAUNA



MALDIVES

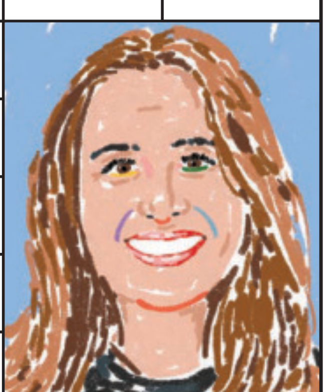
Minister of environment, climate change and technology

● Building a floating city to boost resilience to storms and rising sea levels

Climate change has become an existential threat to communities in the Maldives. The nation of 1,200 islands in the Indian Ocean is so vulnerable to rising sea levels and freshwater contamination from flooding that scientists say it risks becoming uninhabitable by midcentury. Aminath Shauna, the country's minister of environment, climate change and technology, last year gave the green light to construct a floating city. The joint venture with a Dutch company aims to create a community resilient to climate change—similar to early-stage concepts proposed for other island nations. The plans for the Maldives Floating City include a web of artificial coral designed to support housing for about 20,000 people, along with hotels and shops, about a 10-minute boat ride from the capital, Malé.

ORIANA PAPIN-ZOGHBI

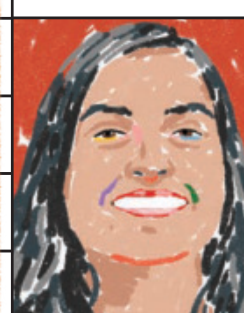
Co-founder and CEO of AOA Dx | US



● Improving survival rates for women with ovarian cancer with an early-detection test

Some 225,000 women a year are diagnosed with ovarian cancer, a disease that accounts for more deaths than any other cancer of the female reproductive system, largely because it's difficult to detect. Oriana Papin-Zoghbi says her company, AOA Dx, can boost chances of survival through early detection using a tool called Akrivis GD. A 2022 study found that the liquid biopsy can identify biomarkers for ovarian cancer tumors with more than 90% accuracy.

SHRUTI SHRUTI



INDIA

Co-founder and CEO of ApnaKlub

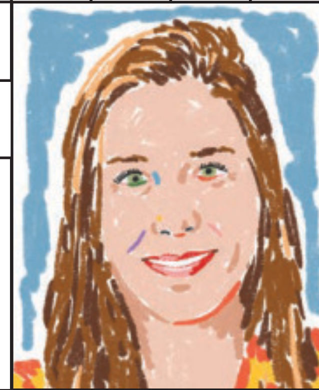
● Supporting rural Indian entrepreneurs with business-to-business wholesale solutions

India's mom and pop shops—what locals call *kirana* stores—account for more than three-fourths of the country's retail sales, but these independent operations typically rely on small local distributors for their goods. To help kirana owners trim costs and broaden their offerings, entrepreneur Shruti Shruti created ApnaKlub, a wholesale platform focused on basic consumer goods such as shampoo, baby wipes and toilet paper. ApnaKlub digitally connects retailers from rural and semi-urban areas to national brands, providing them with high-quality products at competitive prices. Since its founding in 2020, ApnaKlub says it's grown to 40,000 active users monthly.

BETH TELLMAN

Co-founder and chief science officer of Floodbase

US



- Monitoring real-time data to protect communities from flooding linked to climate change

Floods are the most common and costly natural disaster, but 83% of global economic losses from flooding over the past decade were uninsured, according to insurer Swiss Re Group, in large part because today's flood maps don't capture the real risks. Beth Tellman and her crew at Floodbase want to harness the power of data to help communities better prepare as such disasters become more common with climate change. Floodbase uses satellites and on-the-ground observations of hydrological and meteorological data to generate real-time flood maps. The information can help insurance companies and government institutions offer more comprehensive flood policies and protections. This year, the US Federal Emergency Management Agency hired Floodbase to provide flood analytics.

REGI WAHYU



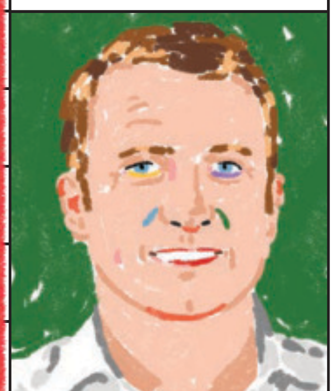
INDONESIA

Co-founder and CEO of Hara

- Using blockchain to unlock financing and insurance for small-scale farmers

Regi Wahyu spent his career in business development leveraging data to help organizations grow, and now he's turning his expertise to improving the lives of Indonesia's 34 million farmers. Hara, Wahyu's Jakarta-based company, uses blockchain technology to collect and manage farm data such as soil and crop conditions, pest infestations, land ownership and grain transactions. Hara wants to make the data available to prospective lenders and insurers so small-scale farmers can more easily get financing and risk protection.

ADAM WENCHEL



US

Co-founder and CEO of Arthur

- Helping AI companies reduce bias in the information their systems provide

Generative artificial intelligence is one of the most significant technological advancements of our time, but critics fret that the oceans of information such systems scan to create their models can reinforce cultural biases, increasing the risk of discrimination against disadvantaged groups. Adam Wenchel has crafted an algorithm to increase the objectivity of large language models such as ChatGPT. An Arthur AI tool runs checks for things such as offensive words or phrases and "hallucinations" (when AI comes up with an answer that's not connected to relevant data) to reduce the danger of inequitable responses, and it detects and prevents malicious activity from harming organizations that deploy large language models. Another tool allows users to compare the strengths and weaknesses of different models. Arthur customers include the health insurer Humana and the US Department of Defense.

VRIKO YU

Co-founder and CEO of Archireef

HONG KONG



- Using 3D-printed artificial coral reef tiles to protect oceans

From 2009 to 2018, about 14% of the world's coral reefs were lost, and the rest are at risk of dying because of climate change. Marine biologist Vriko Yu has co-founded Archireef, which is working with the University of Hong Kong to develop an artificial reef structure. The goal is to avoid problems that have plagued such concepts in the past, which haven't managed to emulate the delicate chemical balance of the coral ecosystem. Archireef's solution is 3D-printed terra cotta clay tiles that mimic the original structures and erode over time, helping promote the growth of genuine, living reef systems. Corals attached to Archireef's artificial terra cotta tiles have been able to achieve a survival rate of up to 98%.

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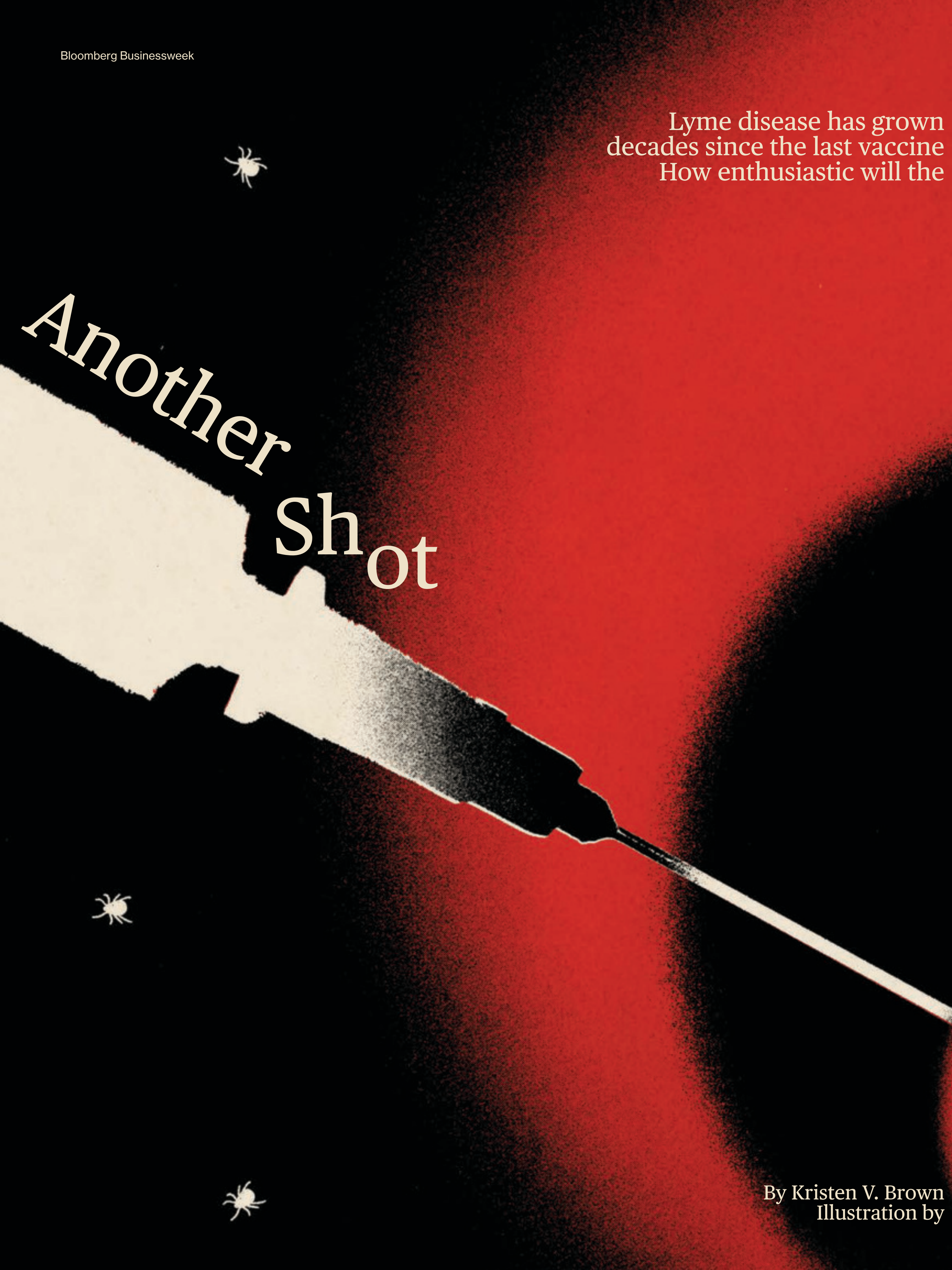
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Lyme disease has grown
decades since the last vaccine
How enthusiastic will the

Another Shot



By Kristen V. Brown
Illustration by

August 28, 2023

explosively in the two-plus
was pulled from the market.
reception be for a new one?



and Nacha Cattan
Vartika Sharma

If you want to get vaccinated against Lyme disease today, your choices are limited. In fact, you'd have to find a rogue veterinarian willing to experiment on you. The only options on the market are for dogs.

This wasn't always the case. In December 1998, drugmaker SmithKline Beecham Plc (now GSK Plc) got approval for the first Lyme vaccine for humans, Lymerix. Ads for the shot featured a woman on a verdant lawn who warns: "I got Lyme disease last spring, and I'm being treated for serious health problems. I couldn't prevent it then, but *now* you could." Lymerix was shown to prevent the disease about 75% of the time, which is pretty efficacious; the annual flu shot is between 40% and 60% effective, depending on the year. And Lymerix was an ingenious scientific achievement. It neutralized the bacteria that causes Lyme while it was still in the tick.

But Lymerix faced obstacles. Regulators had given it a lukewarm endorsement. In the mid-1990s, only about 16,000 cases of Lyme were reported in the US each year, mainly clustered in the Northeast where the black-legged deer ticks that spread the disease were most common. It wasn't a national concern.



A 1999 ad for Lymerix

One doctor testifying on an advisory committee called it a "yuppie vaccine" for people who "pay a lot of money for their Nikes and their Esprit" and are "going to travel to Cape Cod."

Lymerix was also approved the same year that a British physician named Andrew Wakefield published an explosive (and, eventually, discredited) paper linking the common childhood vaccine for measles, mumps and rubella to growing diagnoses of autism. When his theories crossed the Atlantic, they joined forces in the US with another vaccine myth in circulation: that a harmless, mercury-based vaccine preservative was also causing autism in kids. This combination essentially ushered in the modern era of vaccine hesitancy. And with so much anti-vax sentiment bubbling, it didn't take long for concerns about the new Lyme shot to emerge, too.

About a week after the *New England Journal of Medicine* published Lymerix's Phase III trial data, Allen Steere, one of the discoverers of Lyme, unwittingly helped launch what would become an all-out war on the vaccine. In *Science*, Steere and his collaborators suggested a theory for why some people with Lyme experienced arthritis. Their bodies, they wrote, might be having an autoimmune response to a small part of a protein, called OspA (for "outer surface protein A"), on the Lyme bacteria because it was structurally similar to a human protein.

"If you think about what we do and mitigation, it

OspA was what Lymerix targeted—and soon after it hit the market in 1999, people who'd been vaccinated started reporting troubling side effects such as joint pain. They blamed Lymerix and sued SmithKline Beecham, though regulators found no merit in the concerns, and the hypothesis Steere and his colleagues proposed was ultimately not supported. (SKB settled a half-dozen class-action lawsuits by paying attorneys' fees.) The theory "was picked up and blown all out of proportion," says Steere, who's a professor of medicine at Harvard Medical School and a rheumatologist at Massachusetts General Hospital in Boston.

And there was yet another issue. A vaccine called RotaShield, which was designed to prevent kids from catching rotavirus, the most common cause of diarrhea in young children, was withdrawn from the market after investigations revealed it significantly increased chances of a serious bowel obstruction in infants. "This was a one, two, three hit on vaccines," says Paul Offit, director of the Vaccine Education Center at Children's Hospital of Philadelphia and an adviser to the Food and Drug Administration. "Vaccines like Lyme suffered from all that."

In 2002, three years after Lymerix's introduction, it was shelved. Predictions suggested that fewer than 10,000 people would get the vaccine that year. The maker of ImuLyme, a potential competitor, never even tried for FDA approval, presumably because of the hassle SKB faced and the lukewarm regulatory environment. The success of a vaccine is often as much about feelings as facts, and the feeling at the time was that one for Lyme was either unnecessary or unsafe.

But times change—at least, that's what Pfizer Inc., in partnership with French drugmaker Valneva SE, is betting. Phase III trials are underway for their Lyme vaccine (dubbed VLA15 for now), which is expected to be available in 2026. So far scientists and executives at the companies suggest it's likely to be safe and effective, since it works much the same way Lymerix did.

In the decades since Lymerix failed, Lyme has become the most common vector-borne (tick, mosquito, flea, etc., to human) illness in the US. The companies' hunch is that its explosive growth will convince Americans that they need and want a Lyme shot. And for millions of people who'd like to avoid a potentially chronic illness, this will be welcome news. Still, there's vaccine fatigue or antipathy to contend with. Enough people eschewed vaccines entirely to prolong the pandemic. There's even been a recent resurgence of measles.

Regardless, it's hard to argue against the need for a Lyme vaccine. "There's a lot of interest," says Paul Auwaerter, clinical

STEERE: PHOTOGRAPH BY ROSS MANTLE FOR BLOOMBERG BUSINESSWEEK

in terms of personal protection really hasn't worked"

director of the infectious disease program at the Johns Hopkins University School of Medicine and an investigator in Pfizer's Phase III trials. "If you think about what we do in terms of personal protection and mitigation, it really hasn't worked."

What would go on to be called Lyme disease was first recognized in the mid-'70s after a cluster of people—including, bizarrely, kids—suddenly presented with symptoms that resembled those of rheumatoid arthritis, such as swollen joints, in and around the town of Lyme, Connecticut. The main culprit, it was revealed in the early '80s, was a newly discovered bacterium called *Borrelia burgdorferi* that had hitched a ride in the midgut of the tiny deer tick.

Lyme has baffled medical science ever since. Sometimes transmission is clear, thanks to the appearance of a distinctive bull's-eye rash. Sometimes the rash looks different—a solid oval, say. In about a third of cases, there's no rash at all. Often, people have no idea they've been bit by a tick, especially if it's a nymph. They're about as big as a poppy seed, whereas an adult deer tick is the size of an apple seed.

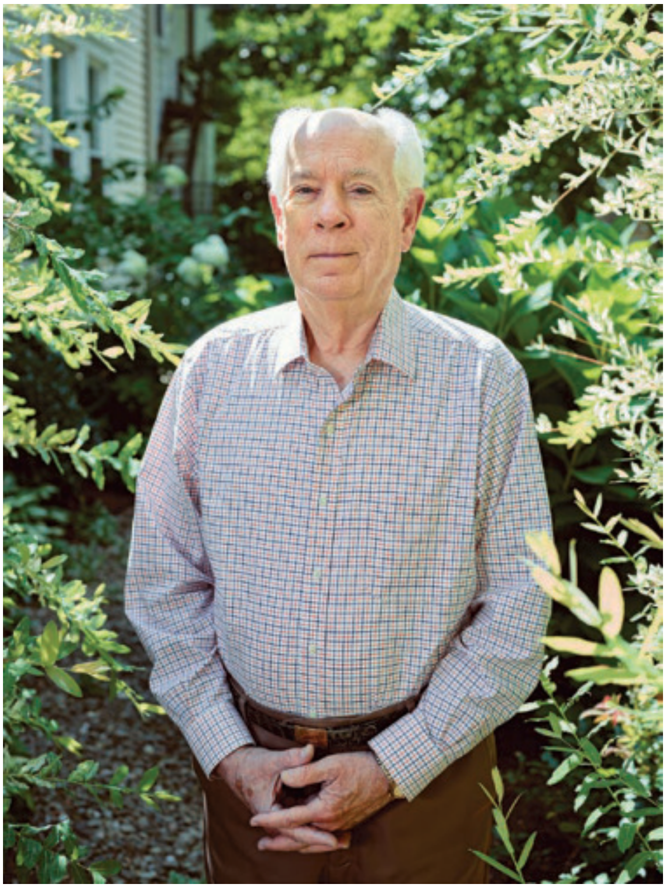
The disease isn't always easy to diagnose and treat. Lyme tests typically look for antibodies to the bacteria and so can be negative for weeks after an infection. Symptoms—fatigue, joint pain, fever—can also take weeks or more to appear and are similar to those of many other illnesses. And while some patients respond to a quick round of antibiotics, for others symptoms can persist for a lifetime.

Each year, prior to the pandemic, about 35,000 cases of Lyme were reported to the Centers for Disease Control and Prevention. That number was by all accounts a wild undercount, because the system relies on busy health-care providers to submit records. In 2021, to get a sense of the real numbers, CDC researchers looked at insurance claims and concluded about 476,000 people are diagnosed and treated for Lyme each year. (This is likely inaccurate as well, because not everyone who's treated for Lyme winds up having it.) Many celebrities have gone public with their diagnoses. Kelly Osbourne, daughter of Ozzy, wrote about her long-term battle with Lyme in her memoir. Alec Baldwin, Kathleen Hanna, Kris Kristofferson, Avril Lavigne, Amy Schumer and Ben Stiller are some of the other famous Lyme sufferers. Lyme was even at the center of a multiseason story arc on *The Real Housewives of Beverly Hills*.

Ticks reproduce at an incredible rate, with adult females laying thousands of eggs at once. They're also extremely durable. Deer ticks can go months without a blood meal and survive days underwater. Deer and small rodents are essential to ticks' survival. They lay their eggs on deer, and then the nymphs fatten up on rodents before jumping back to deer. (Contrary to popular belief, mice, not deer, are usually the source of a Lyme infection.) As our world has encroached upon those of animal and insect, more opportunities have been created for Lyme to spread to humans.

Research suggests that as many as three-fourths of people contract Lyme at home—not hiking or camping, but grilling, gardening and playing in the backyard. It's no longer merely a problem for the Nikes and Esprit crowd, either. The deer tick is now found all along the East Coast, as well as in the Midwest and Pacific states. The number of counties where deer ticks are present has more than doubled in about the last two decades. In Western Europe, estimates of cases treated run as high as about 200,000 annually. "There's much more of it around," says Annaliesa Anderson, Pfizer's head of vaccine research and development, citing climate change as another reason for Lyme's spread. "Ticks thrive in the summer, and we're seeing longer summers. We're seeing winters that aren't quite as cold, so there isn't quite a big freeze-off of the ticks." She adds, "There's an expectation that numbers are going to go up."

That, basically, is why Pfizer and Valneva decided to try again. It also helps that they're not so much inventing as reinventing a vaccine by building off the science behind Lymerix. *B. burgdorferi*, the bacterium that causes Lyme, is what's known as a spirochete—a twisty structure with a striking resemblance to fusilli. In the early '90s researchers ▶



Steere

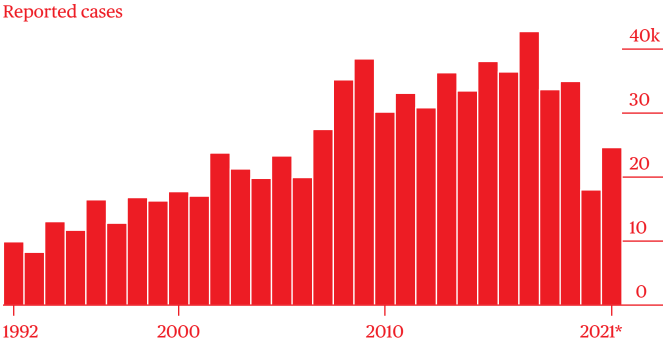
◀ reported that when they exposed mice to a protein on *B. burgdorferi*'s surface, OspA, it triggered the development of antibodies that protected them from infection. OspA only exists in ticks; in other hosts, it becomes a new protein, OspC. After Lyme-infected ticks fed on OspA-immunized mice, the ticks—to the surprise of the researchers—no longer had the disease. The ticks had been cleared of their infection by feeding on the mice. OspA "kills the bacteria in the tick before it has a chance to become infectious," says Sam Telford, a professor of infectious disease and global health at Tufts University who collaborated on some of the experiments. To a degree, it was immunization by proxy.

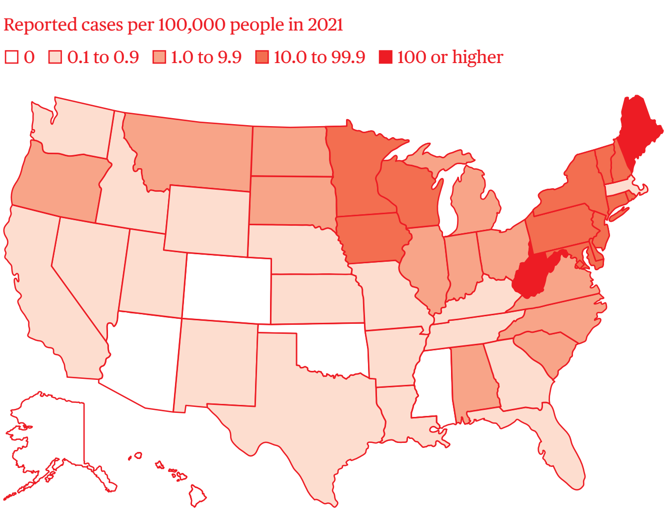
SKB licensed the technology for Lymerix from these researchers. The Pfizer-Valneva shot will be a more finely tuned version, targeting a smaller region of OspA. The more targeted the vaccine, the less risk there is of side effects. It will also protect against more types of *B. burgdorferi*. Lymerix was only formulated to protect against a version that's common in the US, but the new shot will target six, including those prevalent in Europe. It's also expected to work in children. (Lymerix wasn't recommended for kids.)

Phase III trials are slated to wrap up in 2025, and Pfizer's Anderson says they should show the new vaccine to be at least as effective as Lymerix. Recipients will likely need an annual booster after an initial series of three shots over the course of up to nine months.

Lyme Disease in the US

Reported cases





*IN 2020 AND 2021 FEWER CASES WERE REPORTED BECAUSE OF THE PANDEMIC.
DATA: CENTERS FOR DISEASE CONTROL AND PREVENTION. INCLUDES CONFIRMED AND PROBABLE CASES. STATE-SPECIFIC PRACTICES INFLUENCE REPORTING.

Pfizer and Valneva aren't alone. Moderna Inc. has a shot in development using the same mRNA technology behind its Covid vaccine, and a group at the UMass Chan Medical School in Boston announced it was working on a vaccine-like preventive shot that would require a new dose annually.

How big the market for these vaccines will be is unclear. Neither Pfizer nor Valneva has published sales projections. Investment bank Leerink Partners LLC projects yearly sales of as much as $1.1 billion by 2032. BMO Capital Markets, a financial-services company, called the Pfizer-Valneva shot a "hidden gem" in a November report. BMO cited growing exposure to Lyme in the US and Europe, a lack of competition and anecdotal feedback to Pfizer executives (shared with BMO) about broad interest in clinical trials.

But any conversation about the future of Lyme vaccines is shaped by their past. Although Steere, one of the researchers who discovered the disease, turned out to be wrong about the autoimmune hypothesis, major media stories about people getting the Lymerix shot and suffering side effects—not just joint pain but, also, paralysis—terrified the public. Conspiracy theories proliferated: Lymerix wasn't pulled from the market because of sales but because something was wrong with the drug. Even though the cases of arthritis among vaccine recipients were roughly equal to the general population, the FDA found, some people "felt they were being deceived and that the process was not transparent," says Pat Smith, president of the volunteer-run Lyme Disease Association in Jackson, New Jersey.

Smith, who's had two daughters contract the illness, is a de facto spokesperson for people dealing with what's known as post-treatment Lyme. For much of the disease's history, patients who didn't recover after the usual course of antibiotics have faced intense skepticism from mainstream medical practitioners. The symptoms of Lyme, after all, look a lot like many other illnesses. Even with a diagnosis, no one-size-fits-all treatment exists.

What's emerged to deal with this population is a cottage industry of medical practitioners who specialize in diagnosing and treating these cases—sometimes plying intensive, expensive and still-unproven therapies to treat people who may or may not even have Lyme. People suffering from the disease, as well as their loved ones, advocate for better prevention and treatments. But fears linger; they live with symptoms such as

BULL'S-EYE: JAMES GATHANY/CDC. OFFIT: MICHELLE GUSTAFSON

"Covid fundamentally changed about vaccines. Lyme is

arthritis and worry the vaccine would lead to others suffering, too. "We are interested in the possibility of a vaccine," Smith says. "The issue is the safety and efficacy."

Of course, even if the vaccine is deemed safe and effective, some people will shun it. Vaccine hesitancy became a major public-health issue during the pandemic, despite the more than 1.1 million US deaths from Covid. Matt Motta, a political scientist at Boston University's School of Public Health who studies hesitancy, has tracked how fears about Covid vaccines affected thinking about other treatments. In a forthcoming study, based on research conducted in April 2020, Motta and his colleagues found that of the 28% of respondents who didn't intend to get a Covid vaccine, 63% said they would also not be "very likely" to get immunized against Lyme. Overall, less than half of respondents were "very likely" to get a Lyme shot when one became available. "Covid fundamentally changed the way that Americans think about vaccines. Lyme is not immune to it," Motta says.

Valneva's chief executive officer, Thomas Lingelbach, essentially writes this group off. "You will never be able to convince them. It was true 20 years ago, and it's still true today," he says. "And so our approach is an approach of education and communication." To that end, Pfizer says it plans to study the shot in people who've had or have Lyme—if you've had it once, you can get it again. And both companies have tried to explain how their vaccine will differ from Lymerix.

A change they've made is to remove the string of genetic code tied to the allegations of side effects, replacing it with that from another type of OspA. "Even if there was a perceived risk," Pfizer's Anderson says, "the way that this vaccine has been made is that risk has been taken out." But not everyone's concerns have been alleviated. Earlier this year, Pfizer dismissed about half the patients recruited for Phase III trials, citing violations of good clinical practices at sites run by Boston-based Care Access. (Care Access didn't respond to requests for comment. At the time, the company said it disagreed with Pfizer's decision.) Pfizer said vaccine safety was not at issue, but in the Lyme community the news fed the suspicion that this vaccine had safety problems, too. The dismissal pushed the projected year the vaccine will enter the market from 2025 to 2026.



A bull's-eye rash at the site of a tick bite



Offit

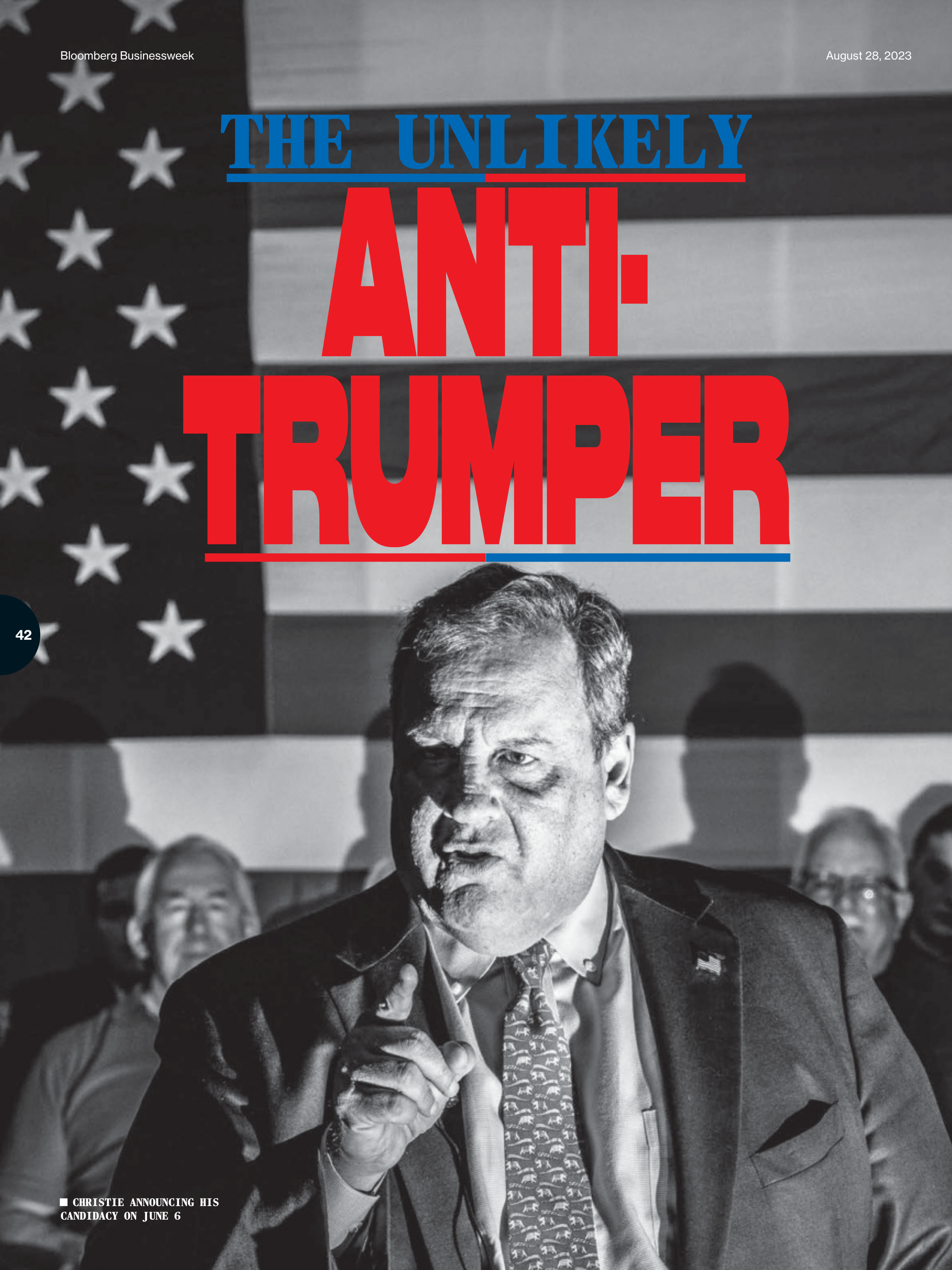
Regardless of interest, before anyone can get the shot, regulators have to approve it. But the enthusiasm behind that thumbs-up is critical. In the US, some manufacturers are protected from lawsuits by the National Vaccine Injury Compensation Program, which was created in the '80s following large jury awards for vaccine-related problems that public-health officials largely believed were unfounded. The program provides compensation to patients found to have legitimate claims from a kitty amassed through vaccine taxes in what's popularly known as "vaccine court." But Lymerix wasn't covered by the program, because the drug didn't meet its criteria, which include "routine administration to children or pregnant women." It was only recommended for people age 15 to 70 who had frequent exposure to tick-infested areas.

If the new vaccine gets a "soft" yes, the companies could again be vulnerable to lawsuits. "We're going to be right back to where we were 20 years ago," says Offit, the director of the Vaccine Education Center and an FDA adviser, who was also on Lymerix's clinical recommendation committee. "The key is to make sure that these days this company is not subjected to outrageous litigation." It's too early to know how likely a soft yes is. The CDC is researching what concerns health-care providers and the public may have with a Lyme vaccine. Kiersten Kugeler, an epidemiologist at the CDC's division of vector-borne diseases, says, "Having a safe and effective vaccine that is FDA-approved for Lyme disease would be so important."

A full-throated endorsement would've been far more helpful two decades ago. Telford, the Tufts epidemiologist, says it kills him to think about how the market for Lyme vaccines would have developed—the kind of competition that would have sprung up to produce more effective versions. "We would have had other options now," he says. Not to mention many fewer people with a mysterious, debilitating disease. Ⓑ

the way that Americans think
not immune to it"

THE UNLIKELY ANTI-TRUMPER



■ CHRISTIE ANNOUNCING HIS CANDIDACY ON JUNE 6

CHRIS CHRISTIE

WAS ONCE A TRUMP ENDORSER AND VP HOPEFUL. NOW HE'S RUNNING AGAIN FOR THE TOP JOB BY ATTACKING THE OFT-INDICTED FRONT-RUNNER.

WILL ANYONE BUY IT?

BY JOSHUA GREEN

Every Republican running for president has to do one thing to have a shot at winning: break Donald Trump's grip on the party's voters. And yet only one seems to really be trying. As most candidates twist themselves into knots to avoid offending Trump—even with the indictments piling up—former New Jersey Governor Chris Christie is taking an entirely different tack. "Here's my problem, and why I got in," Christie said with slightly exaggerated Jersey brashness at a recent campaign stop in Columbia, South Carolina. "They won't tell you the truth about Donald Trump. They're afraid of him!"

Christie wants voters to know he's not. In South Carolina he employed the firm, direct language of a counselor staging an intervention to explain why Republicans need to kick their Trump addiction. The former president, he said, is "selfish" and "disgraceful," a serially bankrupted con man who "doesn't care about you," fleeces small donors to pay his legal bills and knows full well he lost the 2020 election to Joe Biden. "He lies!" Christie practically shouted. If Republicans nominate Trump again, he warned, they'll guarantee Biden four more years in the White House. "Donald Trump," he said, "cannot win."

Rapt and supportive, the audience in South Carolina hardly needed persuading. The trouble for Christie, however, is that many of the attendees weren't Republicans. One of them, the first man in the door, was a 68-year-old Democrat named David Hoch who'd driven two-and-a-half hours to see Christie light into Trump. "I don't like Trump's divisiveness, racism and misogyny," Hoch explained, "and I wanted to see how people in South Carolina will respond to Christie." Several Republicans had come from out of state seeking fellowship with others who haven't given themselves over to Trump. After the event ended, Christie basked in adulation and posed for selfies.

Whether his bomb-throwing amounts to a viable campaign strategy is up for question. Outside periodic oases like the town hall, Christie faces a largely hostile primary electorate. Most polls show him mired in single digits, with lousy favorability ratings. He insists voters will warm up once they hear his message. "I left office five-and-a-half years ago," he told *Bloomberg Businessweek*, crunching Life Savers at a folding table after a New Hampshire campaign stop in late July. "This is about a reintroduction that's going to take some time."

It's not surprising that voters might need updating about where Christie stands. In 2016, when his own presidential bid faltered, he was the first major candidate to endorse Trump, insisting that no one was "better prepared to provide America with the strong leadership that it needs." Today he argues the opposite: that Trump represents a unique danger to the Republican Party, because his mounting legal troubles and unpopularity outside the GOP make him unelectable. As Christie went to South Carolina and New Hampshire and appeared on every cable news show and podcast that would have him, he implored Republicans to cut ties with the former president before it's too late. "We can't do this in a delicate way," he said in a recent CNBC appearance. "He's not going to go away by clicking our heels and hoping we're going to Oz. We've got to go directly at him and tell the truth."

Christie has appointed himself to lead the charge. His long-shot campaign, and perhaps even Republicans' hopes of retaking the White House next year, hinge on whether he can cut Trump down to size. While Christie's polling and fundraising hardly suggest a gathering movement, the Republican primary race is about to shift to a new phase—one that plays better to his strengths. On Aug. 23, candidates will gather in Milwaukee for the first GOP debate. Trump enjoys a sizable lead in the race, and voters haven't yet coalesced around an alternative. Christie hopes this phase of the campaign will vault him into that role.

In theory, the debates should produce a heavyweight spectacle of Ali-versus-Frazier proportions. "If you put Trump and Christie on a debate stage together and made it a pay-per-view event, you'd raise $2 billion and fund the whole campaign," says Dave Carney, an unaffiliated Republican strategist in New Hampshire. "Christie is that fearless and entertaining." Trump, however, plans to skip the Milwaukee debate in favor of an interview with Tucker Carlson. Why expose himself to criticism in a primary race where he has a runaway lead?

Even before Trump spurned the debate and ducked a showdown with his challengers, Christie had prepared for the possibility by sharpening a new attack. If Trump stays away, he said, then "he's a coward"—a message being amplified on television by a Christie-affiliated super PAC, Tell It Like It Is. As Christie is well aware, taunting Trump is the surest way to provoke a response and elevate his own stature in the process. Even if Trump doesn't take the bait, Christie's knack for delivering slashing debate performances should help him stand out. ▶

MARK PETERSON/REDUX

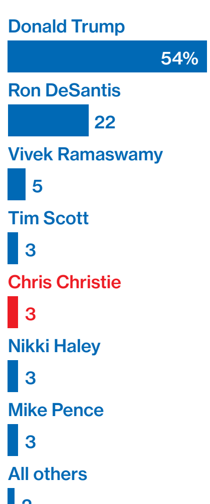
◀ With Florida Governor Ron DeSantis in a tailspin and the role of chief Trump alternative appearing to be wide open, filling it with a voluble critic who has nothing to lose might be the only thing that can keep Trump from the Republican nomination. What Christie's many skeptics wonder is whether he really thinks he can become president—or whether exacting vengeance against Trump would be victory enough.

Long before he devoted himself to stopping Trump, Christie was the man who anointed him, becoming the first Republican candidate to drop out and endorse him in 2016. Christie had entered the primaries weakened by a scandal over the politically motivated closure of the George Washington Bridge, which had roiled the end of his governorship and led to felony charges for several top aides, even as he denied knowledge of what had happened. What's more, his political persona—the loud, confrontational tell-it-like-it-is tough guy—was swiftly eclipsed by someone who did it better: Trump.

Christie still managed to make a name for himself among the many Republican also-rans. The indelible highlight of his campaign was a February debate in New Hampshire. Going in, the candidates were all jostling to emerge as that cycle's Trump slayer, with Marco Rubio thought to have the most momentum. But Christie had noticed the young Florida senator's habit of mindlessly parroting talking points in response to questions, and given an opening, he gleefully pounced. "There it is, everybody!" he exclaimed from the lectern. "The 25-second memorized speech!" Rubio, panicking, kept repeating himself anyway. Social media instantly branded him "RubioBot," and by the next morning, a Democratic staffer clad in a silver cardboard box and a colander helmet had brought RubioBot to life, dancing around before an amused political press corps that was already writing the senator's political obituary.

Trump loved it. "After the debate," Christie recalled, "he'd bring it up all the time: 'That Chris is a killer!'" But while Christie had dusted one opponent, he couldn't gain ground on Trump or separate from the rest of the field. A few days later, he decided to end his campaign on a high note.

Who Republican voters would like to see as the GOP presidential nominee



Then he did something that shocked the political world. In late February, with no advance warning, Christie showed up at a Trump rally in Fort Worth and threw in with the front-runner. "I am proud to be here to endorse Donald Trump for president of the United States," he declared. Until that moment, the Republican establishment had held Trump at arm's length—his glitziest endorsement was Sarah Palin. Once Christie anointed him, Trump seemed inevitable. "He did that for one reason," says Steve Bannon, Trump's top campaign strategist in 2016. "He wanted to be vice president."

Christie took heavy criticism and at times appeared visibly uncomfortable with his choice. But as a raw political calculation, it looked like it might pay off. He made Trump's short list and seemed to think the job was his. Still, at the last minute, Trump chose Mike Pence. When Trump won, Christie was assigned to oversee the transition in preparation for what was expected to be a top administration role. Instead, Trump and his inner circle mercilessly turned on him, and he was fired from the transition. "He was like Piggy in *Lord of the Flies*," Bannon says. "Nobody liked him."

Christie became the archetype of a soon-to-be-familiar character: the respected Republican who goes to work for Trump, only to be chewed up and spat out with his reputation in tatters. Afterward, he drifted to the political periphery. He tried lobbying. He became a pundit. He took small steps to rehabilitate his image by offering measured criticisms of Trump. They kept in touch.

■ CHRISTIE AND TRUMP AT THE WHITE HOUSE IN 2017



"I had misgivings along the way," Christie claims. "When I disagreed with him, I'd say it. I remember, because he would call me on the phone and yell about it." Only when Trump tried to overturn the 2020 election did the break become final. "When he got out there at 2:30 in the morning and said the election had been stolen," Christie says, "it showed me definitively that on the biggest stage, in the biggest moment, he cared more about himself than he did about the country."

Trump's apparent self-immolation on Jan. 6 convinced many top Republicans that he was finished and prompted a wave of criticism. But when it became clear his support was intact, most ambitious Republicans snapped back to faithful subservience or made elaborate efforts to avoid weighing in on him altogether. Christie did not do that, stating that he was "absolutely sickened" by Trump's actions and calling them "an impeachable offense."

Behind the scenes, major donors were growing frantic for a sane, electable alternative. Many initially backed DeSantis. On paper, Christie also fit the bill: a seasoned governor and good communicator with a national profile who wouldn't routinely self-detonate and threaten the economy or global stability. That's helped him attract major contributors from

ANDREW HARRER/BLOOMBERG. DATA: JULY 2023 MONMOUTH UNIVERSITY POLL OF 681 REPUBLICAN AND REPUBLICAN-LEANING VOTERS

“WHEN YOU CROSS THE PEARLY GATES,” A WOMAN TOLD CHRISTIE, “YOU WILL BE REWARDED FOR TELLING THE TRUTH ABOUT DONALD TRUMP”

the business and investing worlds, including entertainment mogul Barry Diller and billionaire hedge fund titans Stanley Druckenmiller, David Tepper and Paul Tudor Jones, as well as financiers Lewis Eisenberg and Anthony Scaramucci and real estate developer (and noted Clarence Thomas benefactor) Harlan Crow. To further augment his presidential stature, Christie made a surprise Aug. 4 trip to Ukraine to meet with President Volodymyr Zelenskiy in Kyiv, witness the devastation inflicted on the country by Russian forces and pledge continuing US support in a Christie administration.

But outside of executive boardrooms, Christie’s return to presidential politics has been rough. A July 25 Monmouth University poll found that only 18% of Republican voters view him favorably, with 55% viewing him unfavorably; in March, he’d sat at 24% favorable and 42% unfavorable. On July 31, a *New York Times*/Siena College poll found him drawing a meager 2% of likely Republican primary voters, even as 22% held an unfavorable view of Trump. “There is definitely a non-Trump wing of the party,” says Seth Masket, a professor of political science and director of the Center on American Politics at the University of Denver. “But they aren’t flocking to the candidate who is yelling at Trump.”

Masket has special insight into why this may be. Every two months he conducts a survey of Republican county chairs—the local functionaries who make up the party’s backbone. Christie generates far more opposition than anyone in the field, with 57% saying they don’t want him as the GOP nominee. (Pence and former Arkansas Governor Asa Hutchinson, both measured Trump critics, are next, polling in the low 40s.) At least for now, Christie appears to be the savior Republicans don’t want, drawing little support from Never Trumpers or party stalwarts. “My impression,” Masket says, “is that he’s just not very well trusted.”

Christie is doing what he can to manage expectations and seize the “underdog” mantle. In South Carolina, he reached all the way back to 1880 to liken his position to that of James Garfield, who wasn’t considered a presidential contender going into the Republican convention but bested Ulysses S. Grant on the 36th ballot. At a gathering of New Hampshire business leaders a few days later, Christie warned that until voting starts, “Trump will be ahead in every poll you see.”

But Christie maintains that by the time voters do cast ballots, the avalanche of political attacks and legal troubles will weaken Trump to the point that he’ll be beatable. And because early primary states such as New Hampshire and South Carolina allow Democrats and independents to vote—and Christie polls better in those places than he does nationally—the momentum from these early upsets will slingshot him to the nomination.

That’s the theory, anyway.

It’s hard to find anyone outside Christie’s orbit who puts much stock in it. That isn’t to say they don’t believe he could have a meaningful—perhaps even transformative—effect on the race. “His willingness to take the sledgehammer to the president gets him on TV and gets him noticed,” says Carney, the New Hampshire Republican strategist. “But nobody’s talking about him at cookouts yet. He’s doing the dirty work for the other candidates, without doing himself any favors in terms of building support for a Christie presidency.”

Out on the trail, Christie often mocks his fellow candidates’ fear of Trump. “He’s like Voldemort in the *Harry Potter* books,” he likes to say. “He who shall not be named.” One motivation for their circumspection is that the job of Trump’s running mate is wide open and probably a more realistic ambition, given his lead in the race. That’s not an option for Christie.

On the other hand, if he loses the primaries but still manages to stop Trump, he could emerge with something important: atonement for helping launch Trump’s presidency in the first place. “When you cross the Pearly Gates,” an elderly woman told Christie at his town hall in South Carolina, “you will be rewarded for telling the truth about Donald Trump.”

Such a political and personal rehabilitation wouldn’t be merely a moral achievement. It would also bring professional opportunities: perhaps a big TV contract, a sinecure at the lavishly funded anti-Trump group the Lincoln Project, a high-profile partnership in a law firm, or even a top job—attorney general?—if another Republican wins the White House. Gazing a bit further into the future, it would endow Christie, who’s only 60, with the aura of senior statesman whenever the post-Trump era of Republican politics finally arrives. He could run again someday in a world anew.

Not surprisingly, Christie rejects the notion that he could win simply by stopping Trump. “That’s only half the fight,” he says. Furthermore, he can’t conceive of Republicans passing him over and anointing one of the meeker alternatives “while Donald Trump lays like a dead corpse on the floor. I just don’t think that’s the way it’s gonna work.”

The way he’d like it to work: Christie mops the floor with Trump in future debates. The media goes bananas. Republican voters, conditioned by Trump to despise weakness and respond to strength, abandon the front-runner and acknowledge the new sheriff in town. “They’re going to think, ‘OK, he did that to Trump—what in God’s name will he do to Joe Biden?’” Christie says.

Lately he’s been reading a lot of history, and not just about James Garfield. It’s motivated him to keep going, to keep pounding on Trump even as the strategists and pollsters and media pinheads say it’s not working. All the naysayers are just covering their asses, he says, because the polls don’t yet show what he’s certain is going to happen once the next phase of the primary gets underway.

“The guy who kills the king usually becomes the king himself,” Christie says. “Not somebody else.” Ⓑ

How The Six Became The One



From left: Seddon, Sullivan, Resnik, Ride, Fisher and Lucid



Ride monitoring control panels on the space shuttle's flight deck

NASA's first six women astronauts faced brutal competition, training and sexism. It was a yearslong ordeal with urgent lessons for today. An exclusive excerpt from *The Six: The Untold Story of America's First Women Astronauts*. By Loren Grush

In early 1982, George Abbey, then NASA's director of flight operations at the Lyndon B. Johnson Space Center in Houston, had an important decision to make. NASA had already assigned astronauts to the first six flights of the newly operational space shuttle. For the next three, Abbey would be picking from among a group of about three dozen people the space agency had recruited a few years earlier. They called themselves the TFNGs, as in the military term "the f---ing new guy." (The acronym hasn't caught on like snafu or fubar.) Officially, the NASA recruits cleaned it up to the Thirty-Five New Guys.

Along with the usual military jet pilots, the trainees included doctors, engineers and scientists who could perform more specialized tasks. And the roster Abbey was reviewing looked more like America, too. The Thirty-Five New Guys included the first Black astronauts, the first Asian American astronaut—and the first six astronauts who weren't guys. America was about to put its first woman in space.

The six women on Abbey's list were all brilliant. There was Anna Fisher, an emergency room doctor; Shannon Lucid, a chemist; Judy Resnik, an electrical engineer; Sally Ride, a former tennis player and astrophysicist; Rhea Seddon, a surgeon; and Kathy Sullivan, an oceanographer and geologist. The women didn't talk about it openly, but they understood that they were competing for a spot in the history books alongside John Glenn and Neil Armstrong. "The agency was eventually going to have to pick one of us," says Sullivan. Two women on one mission, at that time, probably seemed inconceivable.

Russia had already sent the first woman into orbit, so this would be a different kind of space race: Which of the Six would be the One?

While the astronauts themselves kept quiet about their competition, the media didn't. Newspapers, magazines and broadcasters picked favorites based in large part on who struck the writers and talking heads as the most feminine. The slim, feather-haired Fisher became an early media darling. Before the women first showed up for training, *Redbook* magazine featured her on its cover, with the article inside detailing her exercise and diet routines. (The ER doctor was pulling 24-hour shifts at the time, so her routines were pretty simple: "Eat dinner and sleep.")

Seddon, too, sat for interviews, photo shoots and endless questions about diet tips. "She looks like a college cheerleader—one of the nicest and prettiest girls on sorority row," read a feature in *Weight Watchers* magazine. And like Fisher, she married a fellow astronaut. Reporters seemed obliged to ask whether the couples would fly into space together. By contrast, articles tended to emphasize Sullivan's larger size and Lucid's three kids.

NASA wasn't openly grading anyone on star quality, but the women understood that their public-relations value was part of the equation. "This is all guys making this choice," recalls Sullivan. "All other things being equal, they will pick a cute one who gets on lots of covers."

Both Ride and Resnik had the look the media wanted, but they didn't want the attention. Ride was naturally shy, and both were wary of the mostly male press corps. By 1982, Ride was already tired of asinine interview questions, while Resnik didn't like the repeated focus on her divorce.

Within NASA, however, the criteria were somewhat different. The story of how Abbey made his choice, and what happened next, continues to resonate today, as the US prepares to send its first woman and person of color to the moon.

Ride grew up playing tennis in California. "Tennis taught me a lot about self-control, self-discipline, how to maintain kind of a relatively cool demeanor," she later said. She dropped out of Swarthmore College to try to go pro but soon wound up at Stanford University, where she got her Ph.D. in astrophysics. One day, while reading the school paper over breakfast in the student union, she spotted the headline "NASA to recruit women." Although she hadn't thought about trying to become an astronaut before, the idea quickly took hold.

Resnik had a similar experience at the University of Maryland, where she was completing her doctorate in electrical engineering. She was a math whiz from Ohio, a classical pianist who seemed to excel at everything she tried. While she'd struggled a bit to shape her interests into a clear set of career goals, her campaign to become an astronaut provided a road map. She started getting into shape and taking flying lessons. She also sought advice from experts, tracking down Apollo 11 astronaut Michael Collins for a meeting at the National Air and Space Museum. "If I want something, I want it," she later said. "I really thought this through."

In Houston, where the Six were riding the Vomit Comet (a plane that offers a taste of weightlessness), meticulously studying each space shuttle system and flying in the back of NASA's fleet of T-38 jets, the smart money kept an eye on each woman's training assignments. Ride and Resnik were especially adept at the Remote Manipulator System, the joystick-controlled robotic arm that space shuttle crews used to grab and move objects outside the craft. They trained with the arm to latch onto satellites, payloads and suited-up astronauts, and to shoot photos and video with a camera embedded in its tip. ▶

◀ Part of the plan for the space shuttle's seventh flight required highly skilled use of the robotic arm. NASA wanted to see if astronauts could perform a type of maneuver known as a rendezvous and proximity operation. After deploying an experimental payload in space, the crew was meant to test whether they could pull the shuttle alongside it and then use the arm to grab it and tuck it cleanly back into the ship. Essentially, the shuttle would be performing a graceful tango with the object, one that required great delicacy and precision.

Ride and Resnik were comparably handy with the manipulator arm, and Fisher became quite adept with it, too. Resnik got so good with the robotic system that NASA brought her into its Mission Control Center in March 1982, during the space shuttle's third flight, in case the flight crew needed help troubleshooting.

By then, though, Ride was already in Mission Control in a much more central role. For the shuttle's second and third flights, she took on the coveted job of capsule communicator, or capcom. This made her the primary liaison between the shuttle's flight crews and the dozens of ground crew workers. Inside the space program, Ride had become a critical part of each shuttle mission. As a practical matter, she was also gaining a much richer understanding of effective communication between the shuttle and Earth.

Abbey and Bob Crippen, the veteran astronaut chosen to command the upcoming robo-arm mission, also appreciated that Ride was cool under all kinds of pressure. Crippen had worked with Ride before and says her temperament was a clear asset—her endurance during intense training, her arm's-length relationship with the press, her grit on the tennis court. "We all knew that whoever was going to be the first woman to fly was going to get more attention than they'd probably ever want," says Crippen. "And so we wanted somebody that we thought could handle all that."

Shortly after the third shuttle flight, Abbey decided Ride was his pick of the Six. His boss, Chris Kraft, took some convincing. He wanted Fisher. So Abbey did what any good engineer would do: He made a spreadsheet. Next to the name of each mission specialist, he put X's to indicate each astronaut's strengths. The grid suggested that it was a close call but that Ride was the winner. Abbey gave her one more X than Resnik, indicating she had a better understanding of more systems. (He listed Fisher as a close third, writing in a comment next to her name that she had "outstanding public presence.")

↓ Ride training in a T-38 jet a few days before her first spaceflight



Abbey says the best astronaut won. "It turned out Sally was the best qualified," he says. "There wasn't a male or another woman who could do it as well as she could on the remote manipulator." Ultimately, Kraft agreed.

Ride heard the news from Abbey and Kraft early on the morning of April 19, 1982, a Monday. Her body tingled on her way to the meeting. She'd been away, on a vacation to Disneyland, when she was ordered to cut the trip short and return to Texas. She figured the summons meant either she was in big trouble or it was the news she'd been waiting for.

Both Abbey and Kraft offered her an out. Abbey asked whether she liked the capcom work more than she wanted to go to space herself. Kraft noted that for Ride the mission wouldn't end when she was back on Earth. Had she thought long and hard, he asked, about the pressure this place in history would put on her, probably forever?

"There was no doubt in my mind that I wanted to do that," Ride later said. She was in. But now she would have to learn a different kind of patience.

By the start of 1983, Ride's training had grown much more intense. Her team began spending more time in the shuttle simulators, including one that convulsed and shuddered to mimic the turbulence of launch and landing. Some of the astronauts practiced flipping satellite deployment switches, while Ride (and crewmate John Fabian) practiced with the robotic arm. Every move of the joystick had to be expertly choreographed so it became second nature.

The simulations were short at first, but over time they grew to last hours, then days. These longest stretches, called integrated simulations, included engineers and flight controllers in Mission Control, too. These sims, which could last up to 56 hours, meticulously rehearsed the biggest moments of what was to be a weeklong flight. To keep the crew on its toes, supervisors would call out glitches and malfunctions that the team would have to address.

In the middle of all this, Ride received a steady string of uncomfortable reminders about her other mission. Sometimes these came from within NASA, like when the engineering team asked her to review the personal hygiene kit they'd prepared for her. Such kits were a NASA tradition from way back and typically included things such as toothbrushes and shaving cream. Ride's, on the other hand, included a makeup bag and 100 tampons.

"You can just imagine the discussions among the predominantly male engineers about what should go in a makeup kit," Ride told an interviewer years later. She spotted Sullivan and

PREVIOUS SPREAD: NASA (2). THIS SPREAD: NASA. BOOK: COURTESY SIMON & SCHUSTER

asked her to take a look. (In fairness, at least one of the Six had requested some makeup options, though it wasn't Sullivan.) The two women struggled to stifle their laughter as Ride gently pulled tampon after tampon out of the bag, all of them strung together like sausages.

The engineers who'd asked Ride to review the kit asked if 100 would be the right number of tampons for her weeklong trip.

"No. That would not be the right number," Ride replied.

"Well, we want to be safe."

"Well, you can cut that in half with no problem at all," Ride said. Sullivan dissolved into giggles.

Ride's treatment by the press, however, was growing tougher for her to laugh off. Her smiling face appeared on the covers of *Newsweek*, *U.S. News & World Report*, *Ms.* and *People*, a decided PR success, and her bosses were right that she was tough to rattle. Yet the pressure on her was relentless. During the press conference announcing her shuttle assignment in early 1982, Ride chuckled along with the rest of the room when a reporter asked: "How does it feel to realize that because primarily of the luck of your birth, along with some good work and so on, you are going to become a footnote in history and a trivia question subject forever, among other things?" ("Gosh, that's quite an honor," she replied.) A year later, at the final prelaunch press conference in May 1983, she didn't hide her disdain when the same reporter asked again how she felt about being a footnote in history.

"I guess that my answer is probably going to be the same as it was a year ago," Ride said. "I'm so excited to get a chance to fly that I'm able to ignore all you people."

The room laughed, but didn't take the hint. Journalist after journalist seemed baffled by the prospect that any woman could handle the work of an astronaut, and Ride did her best to deflect with grace. Then a reporter from *Time* asked: "During your training exercises as a member of this group, when there was a problem—when there was a funny glitch or whatever—how did you respond? How did you take it as a human being? Do you—do you weep? What do you do?"

Ride's face made clear she was thinking, "You cannot be serious." She managed a laugh, shook her head and said something diplomatic. Later in the press conference, Ride found a moment to cut loose. "It's too bad that our society isn't further along and that this is such a big deal," she said in response to another question in a similar vein. "It's time people realized that women in this country can do any job they want to do."

Shortly thereafter, Ride got a break from the BS. The shuttle crew began a week of preflight quarantine, and then, on June 18, she began her week off-planet. In space she remained cool under pressure, excelling at the payload demonstration with the robotic arm. Her crew's mission was a success.

When the shuttle returned, Ride was a public figure on a whole other plane. She met with President Reagan and toured the US and other parts of the world. NASA quickly assigned her to a second shuttle mission, this time as part of a crew that also included Sullivan. By the time she returned to space, Resnik had been there, too. Within a couple of years, each of the Six would journey beyond Earth.

During that time, the pressure on each new woman in space fell sharply, but Ride continued to feel the weight of her mantle. Any perceived slight, like her declining to carry a bouquet of white roses during a presentation, could yield a barrage of hate mail. And while her second space mission also proved to be a success, she never took her third. It was canceled after the space shuttle broke apart during launch in early 1986, killing the seven astronauts aboard. One of them was Resnik.

Ride served on the presidential commission that investigated the disaster, where she learned of key technical problems and management dysfunction. She left NASA the following year, then spent most of the rest of her life in education. Her company, Sally Ride Science, a publisher of teaching materials, encourages children, especially young girls, to study science. The company was acquired by the University of California at San Diego some years back, but it continues operating as a nonprofit under the direction of Ride's longtime partner, former tennis pro Tam O'Shaughnessy. Ride died of pancreatic cancer in 2012.

In the decades since the Six went to space, NASA has broken its glass ceiling and color barrier many times over. Yet the experiences of Ride and her peers continue to resonate as the agency aims for a more inclusive next act. In April, NASA announced that its Artemis program, which intends to put human feet on the moon for the first time since 1972, will include Christina Koch and Victor Glover, the first woman and person of color to travel to deep space.

Although those astronauts didn't face a cacophony of disbelief from the press, there's still a long way to go before the world reaches true parity in whom it sends to space. Fewer than one-sixth of the people who've flown beyond the boundary of Earth have been women, and the numbers for women of color are worse. More opportunities have arisen in recent years for underrepresented groups to see the curvature of the Earth, as commercial companies such as SpaceX, Blue Origin and Virgin Galactic have provided alternate rides to the stars. But their accessibility is limited in other ways, and making personal wealth the primary qualifier doesn't help much with space's other inclusivity problems.

In the next several years, NASA is expected to pick the first woman to walk on the moon. Thanks to the Six and others who came before her, she'll have an easier time of it than Ride did, at least in some ways. But it won't be easy. On the final frontier, like all the others, there's lots more catching up left to do. Ⓑ



← *Adapted from* **The Six: The Untold Story of America's First Women Astronauts**, *published by Scribner, an imprint of Simon & Schuster Inc. Copyright © 2023 by Loren Grush*

Jakarta & Virtual

Bloomberg

CEO Forum at Asean

September 6, 2023 | #BBGAsean

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Most Valuable Influencers



How sports stars became the most important people in men's fashion

By Max Berlinger

FALL STYLE SPECIAL

August 28, 2023

Edited by Chris Rovzar

Businessweek.com

Ryan Stone, a 51-year-old real estate investor in San Diego, thought the athleisure brand ALO was mostly "yoga clothes for women" until he noticed Miami Heat forward Jimmy Butler wearing it. "Some of these guys dress more streetwear, but Jimmy is a bit more mainstream," he says. Seeing Butler decked out in the brand's sleek, workout-ready apparel made him reconsider: "Yeah, I'm gonna go out and buy a bunch of ALO workout clothes now."

These days the most influential displays of men's sartorial swagger won't occur on the red carpets of Hollywood or the catwalks of Paris or Milan. They'll begin on Sept. 7, when Kansas City Chiefs stars Patrick Mahomes and Travis Kelce walk down the tunnel toward the locker room to kick off this year's NFL schedule. They'll ratchet up a notch on Oct. 18, when NBA games begin.

Athletes have been stiff-arming their way into the spotlight by stepping up their fashion game for at least a decade, bringing high-end runway looks to people who might otherwise be shielded from any overt rag trade influence. Today the pregame locker room entrance has become a bona fide media moment, with outfits covered as breathlessly by online fans as Ryan Seacrest does outside the Oscars.

And normally risk-averse shoppers are happily going along for the ride–and enlisting stylists for help. Nicole Pollard Bayme, who provides fashion consulting for business-world VIPs at her company Lalaluxe, says sports stars come up regularly in conversation with her male clients about how they'd like to dress.

She mentions a young tech chief executive officer and father whose uniform consisted mostly of casual slip-on Vans and tech-fabric pants. "During one of our sessions, he mentioned [Golden State Warriors guard] Steph Curry wearing Chelsea boots with slacks," she says, "and it was the perfect opportunity to nudge him toward a new direction." She got boots from George Esquivel, known for making custom footwear for NBA players who often need extended sizes. She also explained that most athletes have their clothes tailored, so she brought in custom jeans from Frame and trousers from Saint Laurent. Her client even started wearing a bag from the Italian label Bottega Veneta after he saw Phoenix Suns guard Devin Booker carry one. "That evolution demonstrates how a little inspiration can spark a transformative change," she says.

Athletes have come a long way from the days of ill-fitting jumbo suits that looked like they were bought on a whim at a strip mall, says Michael Fisher, vice president at trend forecasting agency Fashion Snoops in New York. "For many men, athletes have been the top influencer in their lives. It only makes sense that seeing these guys be comfortable with [oversize] directional silhouettes, colors and patterns would impact everyday trends for the same consumers."

Courtney Mays, a stylist who works with perennial All-Star Chris Paul and other NBA players, agrees with Fisher's assessment. "A lot of guys know who Steph Curry is, know who Chris Paul is," she says.

There's a huge range of approaches among athletes that can appeal to just about anyone's taste, she says. Someone like Miami Heat veteran Kevin Love dresses in more classic Ralph Lauren Americana, whereas Washington Wizards forward Kyle Kuzma wears extremely avant-garde designs from the runway. "You can find yourself in one of these guys and emulate that," Mays says.

Most men tend to be inspired by a specific item rather than an entire look, says Andrew Weitz, who works with high-net-worth individuals on their wardrobe choices at his company Weitz Effect. "It's more about the individual pieces," he says. "I find guys don't gravitate to things

Memorable Moments in Sports Style

Nov. 11, 1973



Quarterback Joe Namath was already a megastar after leading the New York Jets to victory as the heavy underdogs in the 1969 Super Bowl. A shoulder injury kept him out for most of the '73 season, but his sideline fur coat was such a signature he was immortalized in one on the cover of *Esquire*.

Oct. 2, 1995



When the talented, flamboyant and occasionally exasperating Dennis Rodman was traded to Michael Jordan's Chicago Bulls, he became a key part of its three-peat 1996-98 seasons. Yet he was just as entertaining off the court, often wearing crop tops and, famously, a wedding dress to promote his 1996 memoir, *Bad as I Wanna Be*. Chad Avery from @NBAFashionFits says Rodman "really embraced the whole 'Be yourself' and 'Step outside the box' feeling" during the Jordan heyday.

that are distinguishable, but more like an elevated version of a casual look."

Or, to put it in 2023 terms: quiet luxury.

"When I started [in 2002], high fashion and the fashion that athletes wore were two separate things," says Jason Arasheben, who owns the high-end jewelry shop Jason of Beverly Hills. "Now that's merged."

Arasheben has long sold diamond-encrusted accessories at eye-popping prices to athletes, but in recent years he's been fielding calls from consumers who want a specific style they've seen on a player or something similar. "These [NBA players] have, what, 82 games a season? That's 82 times to walk in and out of the stadium. And now it's like once a week, a few times a week, that I get a call saying, 'Hey, I saw so-and-so wearing this bracelet or this watch. Do you have a version of it?'" They're not only inspiring the masses, Arasheben adds, "they're influencing the choices that creative directors at big fashion houses are making. They're driving trends."

In May, Prada signed Chinese basketball player Yang Shuyu as a brand ambassador in an attempt to move away from pop and film celebrities toward athletes. Dries Van Noten dressed his models in oversize jerseys for his spring-summer 2023 collection. Kuzma recently sat front row at runway shows by Rick Owens and Kenzo, and Formula One driver Lewis Hamilton was spotted at a Louis Vuitton show.

Although there's a history of athletes embracing fashion—David Beckham, Dennis Rodman, Walt Frazier and Joe Namath all come to mind—the current frenzied moment is born of social media. With their godlike physiques and astronomical paychecks, they're better suited to luxury fashion than most, and yet the industry mostly ignored them.

"These guys were always dressing," Mays says. "Fashion has been part of basketball culture since the 1970s, '80s, when guys like Frazier and Wilt Chamberlain were walking into the arena in fur coats and fedoras! But it wasn't as big of a thing. Now, because everything is captured in real time on social media, consumers are being exposed to it in a new way."

In other words, Namath's fur coats may have marked an iconic moment, but men weren't rushing out to buy one the way they did when Weitz dressed his client Tom Brady in a lightweight Harrington jacket by Tom Ford for his arrival at the 2021 Super Bowl. (The item, which can cost as much as $5,000, promptly sold out.)

Now there's a cottage industry covering this overlap, from Instagram accounts @LeagueFits (961,000 followers), the NFL-focused @BlitzFits (99,000) and @MLB.Fits (85,000), among others. The result has been a sort of feedback loop where players dress up for the accounts that cover them and then the accounts have more news to cover.

The top athletes get the most attention. "Players like LeBron [James] will always perform well," says Chad Avery, who's turned his account @NBAFashionFits (238,000 followers) from a casual fan page into a serious force. "He's not the biggest risk taker or the best dressed but definitely the most popular player, so that makes a difference."

For Stone, there's a psychological component to dressing well. "The way these guys dress is a direct reflection on the type of game they play," he says. "You know, LeBron, Jimmy Butler, when they walk into the arena, they look good, like they're going to do business. LeBron takes the game seriously and dresses like it. And the results show."

We may have only scratched the surface of athlete couture. Most stylists and consumers note that, though some NFL and baseball stars are popular, NBA players still dominate this aspect of the business. And America has yet to really embrace the most stylish sport of all: soccer.

Oct. 17, 2005



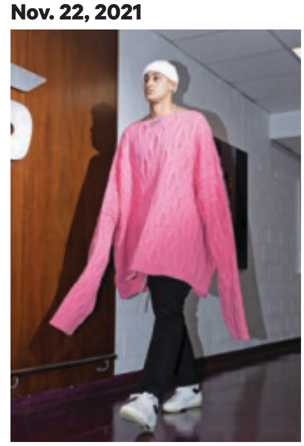
Two weeks before the NBA's 2005 season, then-Commissioner David Stern announced a dress code that banned most clothing associated with hip-hop culture: Timberland boots, jerseys and chains (as seen on Allen Iverson here). Critics called it racist, but today the code is hailed as the catalyst for the "tunnel walk" phenomenon, where cameras document players' outfits before games.

May 31, 2018



For the first game of the 2018 NBA Finals, LeBron James suited up the entire Cleveland Cavaliers squad in Thom Browne's signature shrunken suits. Yet James stole the show, wearing the designer's matching shorts and gray calf-length socks. Fashion Snoops' Michael Fisher calls the four-time MVP "one of the forerunners of influencing trends when he started wearing those suits for the NBA playoffs."

Nov. 22, 2021



Kyle Kuzma got roasted when he arrived to a game in an extra-extra-extra-extra-large pink Raf Simons sweater with sleeves that, despite his 6-foot-9-inch frame, hung down near his knees. But "it helped start a lot of conversations about a return to the super-baggy shapes from the '90s," Fisher says. Kuzma got the last laugh: This January the Washington Wizards released a bobblehead version of the now-celebrated look, and this summer Kuzma sat in the front row at Paris Fashion Week.

PREVIOUS PAGE: PAUL, BECKHAM, BECKHAM JR., HAMILTON, TAPE: GETTY IMAGES. BRADY: AP PHOTO. ROLEX, IWC, JOBH NECKLACE, ALO HAT, NIKE SNEAKERS: COURTESY COMPANIES. THIS SPREAD: NAMATH, RODMAN, JAMES: GETTY IMAGES. IVERSON: AP PHOTO. KUZMA: COURTESY WASHINGTON WIZARDS


Knatchbull wears a three-piece, made-to-measure suit

New Kid on The Block

The Deck is cutting a pattern for women's suits on Savile Row

By Jill Newman

Men have long appreciated the transformative power of a custom-tailored suit: the air of confidence it conveys, the authority it implies, the attention it commands. But that sartorial clout has largely eluded women, who find themselves relegated to off-the-rack clothing in cookie-cutter sizes that often don't do justice to their body.

Daisy Knatchbull, founder of the Deck on Savile Row, is tailoring her modern pieces to fit that forgotten half of the population—curves and all. Her team performs all the customization that men's shops offer, but they also instill body positivity, enhancing what clients love about their figure and tactically disguising what they don't.

According to Knatchbull, her clients' most common grievances are "My legs are too short, my waist is too thick, or my breasts are enormous." It was about time, she says, to infiltrate the old boys' club with the first women's-only storefront on London's most famous fashion street.

Since opening on Savile Row in 2020, the Deck has dressed women from age 16 to 94. Whether they're chief executive officers or celebrities such as Jodie Whittaker, Elizabeth Hurley and Gillian Anderson, they all desire the same thing: elegant, well-fitting clothes that make them feel confident and beautiful.

Sounds simple, but Knatchbull says women have been expected to fit into a limited range of standard sizes, and, unlike men, they face ongoing issues, from "menstruation to menopause to mastectomies," that trigger fluctuations in their shape throughout their life. "The relationship women have with their bodies is complicated," says Knatchbull on a recent visit to her London store. "Their shape is always changing, which is why nobody has bothered with this in the past."

We haven't seen more custom women's options, because this type of hyperpersonalization hasn't been scalable before, says Oliver Chen, managing director and retail analyst at TD Cowen. "But there's a greater demand for this higher-echelon service among women in leadership roles," he says.

In comes the inherently charming and warm Knatchbull, who, at 30, has mastered the art of tailoring a solution for every issue. Want the illusion of a narrower waist? Try a single-breasted jacket with slanted pockets. Longer legs? Wear high-waisted trousers. Longer torso? A slightly extended jacket will do the trick.

Roughly 40% of the Deck's business is repeat clientele, and business is growing. This year, Knatchbull expanded into a larger, 2,000-square-foot space on Savile Row that, unlike the traditional wood-paneled, tweed-covered shops lining the rest of the street, is bright and airy, with walls adorned in custom brown silk de Gournay floral wallpaper and oversize antique gilded mirrors. Clients meet with their tailor, review fabric swatches and plan their wardrobe on a cozy chocolate-brown velvet couch.

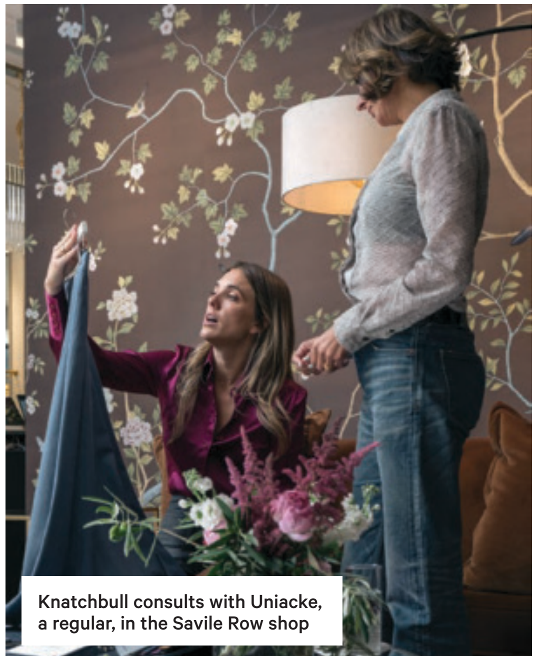
Knatchbull offers only four made-to-measure house patterns (the number of suits in a card deck, hence the shop's name): single-breasted, double-breasted, boyfriend or safari jackets, and straight-leg, cigarette, wide-leg or flared trousers.

"Daisy offers a modern take on a very traditional idea," says Antonia Ede, the Savile Row-trained cutter who opened Montague Ede, a men's shop in London, in 2016. "Women's tailoring has had a bad rap. It's been thought of as frumpy or boxy, but Daisy has shown women you don't have to look matronly or like Bianca Jagger. Her house cut speaks to a modern woman's wardrobe."

The process—which can sometimes feel a bit like therapy—begins with a three-hour meeting with one of the Deck's four female tailors, led by Joline Simister (who served as Queen Elizabeth's personal tailor for many years). The tailors take measurements, make recommendations based on body type and cut patterns for each woman's shape. Clients select fabric and lining as well as details such as buttons and monogramming and return for two more fittings. The final

PHOTOGRAPHS BY CARLOTTA CARDANA FOR BLOOMBERG BUSINESSWEEK





Knatchbull consults with Uniacke, a regular, in the Savile Row shop



garment is ready in 12 to 14 weeks.

The suits are fabricated at an atelier in Porto, Portugal, which allows Knatchbull to keep prices competitive; a two-piece starts at £2,800 ($3,550). The Deck also offers bespoke dresses, coats and shirts, and it's created several bridal suits.

Savile Row's old guard has even taken notice, giving credit to Knatchbull's novel approach. "Many women are looking at tailoring for the first time, and Daisy's made tailoring approachable," says Anda Rowland, managing director for Anderson & Sheppard, the heritage Savile Row shop. "Men's tailored jackets are designed to hang on the shoulders, but with women, there are other things to take into account, like the breast area, waist and hips," she says.

Most Savile Row tailors will make a woman's suit, but understanding the body of a woman is more nuanced. Knatchbull isn't making men's suits for women. Rather, she's creating custom, elegant suiting for the modern woman. (Even Rowland, a leader on Savile Row for 18 years, is a customer; among her favorite purchases is a double-breasted green velvet suit that she says always draws compliments.)

Narinder Uniacke is another client who came to the Deck after enduring decades of off-the-rack disappointment. "Length is an issue for me," says the 5-foot-9-inch Londoner. She was recently in the store for the final fitting of a three-piece pinstriped suit, ordered for Wimbledon. "I'm also quite broad-shouldered and slight everywhere else. If I size up in the chest, the sleeves are too wide or too long." All that's been resolved at the Deck.

"When you wear a custom suit, it lifts you, and you just feel better about yourself," says Uniacke, who owns four suits, as well as an electric-blue velvet blazer, from the Deck. She prefers to wear hers dressed down with a pair of trainers or flat shoes, and she appreciates the little details that can come with a custom suit, such as her three sons' initials embroidered under her jacket collar.

"All you need is one great suit and a few staple items, like a great white shirt, statement earrings, stilettos and a pair of Levi's, and you've got five or six smart looks," Knatchbull says. The "buy better, buy less" philosophy speaks to some consumers' mindfulness of sustainability and longevity. For the Deck's part, its suits are made in natural materials such as worsted wool, silk, cashmere, velvet and linen, and they're finished with seams that can be let out or nipped in over time.

Even with clients such as beauty executive Aerin Lauder and *Bridgerton* actress Adjoa Andoh, Knatchbull is the Deck's most convincing spokesmodel. Tall and slim, she's effortlessly elegant in a white three-piece suit the day I see her meeting clients. She learned an appreciation for fine tailoring while working as communications director at Huntsman, one of Savile Row's oldest bespoke tailors. During that stint, in 2016, she made history as the first woman to turn out at Royal Ascot with a top hat and tails, rather than a dress. The next day she was bombarded with inquiries from friends looking to have a suit made. That was the catalyst for her business.

"I love tradition, and I like to challenge it," says Knatchbull, who was born and bred into tradition as the great-granddaughter of Lord Mountbatten (Prince Philip's uncle, and a great-grandson of Queen Victoria). But she's quick to point out she never leveraged that legacy in business. "There is an amazing history to my family, but it doesn't define me."

To get the Deck off the ground, she raised $150,000 in seed capital and, following the pandemic, an additional $500,000, most of which went into the store. Since she started the business in 2019, annual sales have doubled each year.

Accordingly, word has spread from London to New York and Palm Beach, both locations for pop-up tailoring events she's held. Last year, Lauder hosted a four-day event in her New York showroom, which quickly booked up with 130 client appointments. The American market has since accounted for 30% of the Deck's annual revenue.

Knatchbull plans to enhance her services with an artificial intelligence program that will allow her tailors to take measurements remotely, but the in-person moments at her shop are still her favorite part of the business. She acknowledges that AI will never replace the emotions that come when a woman puts on her first custom suit. "I love seeing women have that sense of confidence," she says. "When they see themselves in the mirror for the first time, they stand taller, and you know they are thinking, 'I look good.'" Ⓑ

Small Change

In an era of digital payments, the humble wallet gets a reboot

By Antonina Jedrzejczak
Photographs by Audrey Melton

Through the ages, wallets have carried it all: paper money, coins, business cards, even snacks. Their everyday, obligatory nature disguises their role as a perfect accessory. Unlike the investment with a capital "I" that a new handbag can feel like, the banal rectangular shape of a continental or card case gives the same thrill without any of the angst.

Wallets are at the forefront of the current growth in the market for small leather goods, according to Benjamin Bond, principal in the consumer practice of Kearney Inc., a strategy and management consulting company. "Asia in particular is set to be a hotbed for this surge," he says. The global market is expected to grow at a compound annual rate of 6.4% through 2028.

The seismic change wrought by digital payments—which have transformed our phones into de facto wallets—has ironically been a key reason for this rise. "Tech behavior is reshaping wallet formats," Bond says. "Modular, convertible and phone wallets—it's all about flexible function and tech incorporation."

This shift is manifesting in a turn to bigger models. "We're seeing our customers gravitate toward larger-sized wallets because they want them to hold their phones as well," says Lucy Wallace Eustice, a co-founder of MZ Wallace Inc. "The all-in-one wallet is becoming a major trend."

On the other side of the spectrum, smaller wallets are embracing minimalism. Bold luxury logos will always have a place in this category, but there's increasing space for consumption that's a bit more friendly to the environment. "Luxury no longer equals excess," Bond says. "High-end faux leather and other sustainable materials are defining a new era of conscious luxury."

Customization, as elsewhere in the high-end market, is very popular. At Cuyana, sales of personalized products are going up months before the holiday gifting season; the brand's wallets can be blind-embossed or gold-foil-stamped with a unique monogram so they feel more personal. Consider it the adult equivalent of back-to-school shopping: "We tend to see an uptick around the fall, as women revamp their wardrobe essentials," says Cuyana co-founder Shilpa Shah.

Whether you zip it, snap it, flip it or fold it, here are a few options to inspire your own search for a favorite hardest-working accessory.



SOMETHING TRENDING
White leather accessories are on the mark this fall, and it's hard to go wrong with the classic rectangular continental shape. Quince's 1-inch-wide pebbled model (right) has ample storage and a zip-around closure for extra security; Radley London's cheery sunflower pattern, meanwhile, carries through to the inside with accents of yellow leather. There are also 19 (!) card slots for the true shopaholic. *$128; radleylondon.com. $50; quince.com*



SOMETHING BIG
At almost 8 inches long, Mansur Gavriel's large M continental in cherry-red Italian calfskin offers a fun twist courtesy of its shape, an homage to the brand's name. *$395; mansurgavriel.com*



SOMETHING TINY
Bright and compact, this 4-by-3-inch zip-around wallet from MZ Wallace is best used for securing the essentials, but its vivid colors mean you'll also spot it easily at the bottom of your tote. Four card slots and a billfold are made from woven Italian leather that extends to the inside, too. *$145; mzwallace.com*



SOMETHING EXOTIC
This throwback accordion wallet from Abas is made from wild American alligator obtained through a Florida wildlife management program. It comes in almost any color, each meticulously hand-glazed for a rich, transparent finish. Inside are multiple slots, a central compartment and a smart flip closure. *$1,400; abasaccessories.com*



SOMETHING FOR THE LOGO
Small but mighty, this snap bi-fold from Prada has nine card slots and a zippered coin purse, all while measuring less than 4 inches. Available in solid bright shades or a cheeky duo of contrasting hues (such as the sand and light blue seen here), it comes in a mix of the brand's signature smooth and Saffiano leathers. *$695; prada.com*



SOMETHING JUST FOR YOU
Whether you opt to strap it to the inside of your purse or carry it solo for a night out, a wristlet gives a wide range of possibilities. Cuyana's pebbled-leather riff on the style has multiple card slots. An increasingly popular move is to personalize it with an embossed or gold-foil monogram. *$118; cuyana.com*

Swim to Suit

Orlebar Brown grows past its beloved bathing trunks to blazers and beyond

By David Graver

It all began with a rejection. British swimwear brand Orlebar Brown may now be expanding into new apparel categories, having grown to almost 50 boutiques after an acquisition in 2018 by Chanel, but it was born in 2007 out of a vacation mishap.

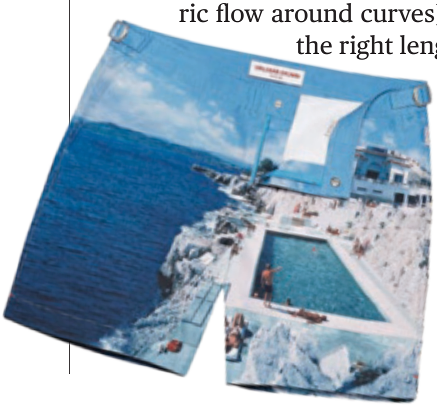


At a luxury resort in Rajasthan, India, Adam Brown—then a self-described "rubbish professional photographer"—was denied entry to lunch for arriving in swim trunks. This dismissal sat with him as he began to question his own professional path. Why weren't bathing suits elegant enough for a sit-down meal? For that matter, why was there more elevated tailoring in women's swimwear than in men's?

Two years later, from his spare room in London, Brown launched Orlebar Brown with co-founder Julia Simpson-Orlebar. (She left the business in 2008.) "After that lunch in 2005, I was sitting in the sunlight and playing with words," he says. "I was saying to myself, 'I don't want a swim short. I want shorts that I can swim in.' "

Brown dove into market research and saw that, aside from French Riviera-inspired luxury swimwear brand Vilebrequin, competition was slim. Other brands were treading in different waters—from surf outfitters selling long board shorts, to Speedo, to fashion houses such as Ralph Lauren that sometimes featured swimwear in seasonal collections.

He also enrolled in a pattern-cutting course but quickly saw it wasn't for him; he was no fashion designer. "All I had was a narrative around one item," Brown says, "and this belief that a swim trunk could fit a person better. I spent ages working on how the waistband sits higher at the back and comes down lower at the front, having darts [angled seams that help fabric flow around curves] at the back, trying to get the right lengths."



After working on samples with nine different factories, he ended up with one style of swim shorts, the Bulldog, in five colorways and four lengths—with 60 elements in all, from adjustable side-fasteners to snap closures and quick-dry fabric.

Brown encouraged his personal network to spread the word. He also built a website, which he likens to "opening a shop on the quietest street in the world." With direct-to-consumer outreach, he began to pick up buzz. Three years after its debut, Orlebar Brown introduced shirts with the same tailored values as its shorts. One terrycloth "toweling" polo conjured a photo of Brown's grandfather from Hong Kong in the '70s. "Right from the beginning, I'd always imagined that swimwear could be part of a bigger brand identity around sunshine, travel, happiness and good times," he says.

This fall, Orlebar Brown will introduce a totally new line, a travel capsule that includes jackets, long-sleeve shirts, two-button blazers, pants and cushioned footwear. It's all made from merino wool sourced in New Zealand.

The collection is tamer, visually, than the swim trunks , which often famously feature photography; Brown suggests it can get you to your destination before you change into something more fun. He calls it "a modern luxury travel edit with tailored sport design touches made with one yarn and one color—designed to give you smart style from home to plane to resort to beach."

To get to this point, the brand has been propelled by carefully considered collaborations, with institutions such as Pucci and the James Bond franchise (which happened after Daniel Craig wore a pair in *Skyfall*), as well as a series of luxury hotels including Hotel du Cap-Eden-Roc, New York's the Mark Hotel and the Beverly Hills Hotel. "Collaborations enable you to present your product in a way that the customer does not normally see it," Brown says.

Partnerships with photographers and photo archives, such as those of high-society documentarian Slim Aarons, have also elevated the trunks—as did an in-house service called Snapshorts, introduced in 2016, which allows customers to send in a personal photo to have put on a pair of shorts.

But it's its function, balanced with this visual style, that continues to set the clothing apart. "Orlebar Brown swimsuits can quickly dry, are durable but flexible and have low drag in the water," says Isiah Magsino, the style news editor of *Town & Country*, who swam competitively for 10 years. "As someone who is also aesthetically driven, the details such as metalware and elegant silhouettes seal the deal. I especially love the setter model—I have a few pairs in different colors—because I can wear them from the beach with a billowy linen shirt and Belgian loafers to lunch without looking like a tacky tourist."

It all ties back to a conversation Brown had with many of his early adopters. "Customers would say to me, 'I feel like I'm on holiday when I put that drawstring bag [that holds the swim shorts] into my suitcase,' " he says. "But Orlebar Brown doesn't just exist on a beach or under an umbrella with a cocktail. It can be about the knitwear, or outerwear, or trousers you wear as you travel to your destination." Ⓑ

COURTESY ORLEBAR BROWN

Point and Click

Gucci's angular slingback with a metal heel is the "it" shoe of the fall

By Kristen Shirley Photograph by Heami Lee

It's all about the sharpened shoe this fall. Models for the season's shows strutted down the runway in sky-high stilettos, kitten-heel slingbacks and gamine flats that, no matter the height, all narrowed to a point at the toes. In its collection, Gucci went wild with the trend, offering an array of pointy-toed shoes featuring funky details and colors that elevated its petite heels. This blue pair ($1,250), made from leather printed to look like crocodile, played with the shape by slightly softening the point to a square.

THE COMPETITION

• Giorgio Armani presented the perfect patent-leather loafer ($925) for fall. It has a sharply pointed toe that adds elegance and a chic buckle detail with a discreet logo.
• The $1,550 Spectadior pump from Christian Dior provides a quirky twist on a classic Mary Jane. It has a slim platform, an angled comma heel and a two-tone black-and-white design.
• Ferragamo's signature Eva pump ($980) has an instantly recognizable heel that connects at the arch of the foot instead of the back.

THE CASE

Gucci's midheel slingback is more than a shoe; it's an attention-grabbing accessory that will become the talking point of any fashion-focused conversation—and may even get some comments on the street. In a rich sapphire, the squared-off toe comes together with the metal heel to telegraph a mature, retro vibe. The gold tiger's-head detail, a signature of the house, can jazz up even the most conservative back-to-the-office look. *$1,250; available at select Gucci stores*



Housing Is Having a Bedroom Boom

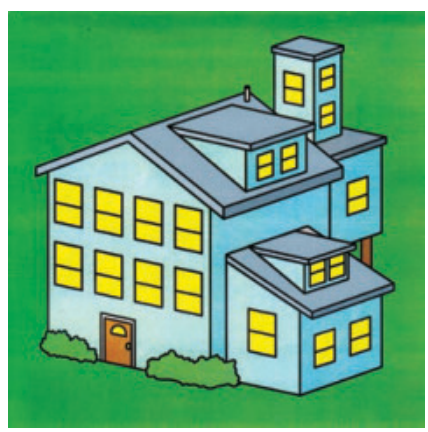
By Justin Fox

Of the just over a million new single-family houses completed in the US last year, 490,000 had four or more bedrooms. That worked out to a 48% share, the highest since the US Census Bureau started keeping track in 1973—and more than double the percentage in 1973.

This might seem a little perverse in a country where almost two-thirds of households now consist of one or two people, and only 21% of four or more. But there are explanations. One is that apartments in the US have headed in the opposite direction, with 52% of multifamily units completed in 2022 consisting of one-bedrooms or studios, the highest percentage since that data series started in 1978. Another is that a lot of those extra bedrooms in new single-family houses aren't really intended for people to sleep in.

The rise of remote and hybrid work—recent survey results from WFH Research indicate that close to 30% of paid full workdays in the US are being worked from home this year, up from around 5% in 2019—is making home workspaces with doors you can close much more important. Eighty-eight percent of builders in a National Association of Home Builders survey said demand for home offices increased during the pandemic, and 72% said a home office was a "likely" feature in a typical 2023 new home, on a par with granite countertops.

It's not that new houses have been getting bigger. While the median floor area of new single-family houses rose slightly in 2022, to 2,299 square feet, it's still below pre-pandemic levels, and quarterly statistics on housing starts indicate that it will fall in 2023. But the uses to which that space is put are changing. Ⓑ —*Fox is a columnist for Bloomberg Opinion*



● WORKING OUTSIDE?
Ninety-three percent of new single-family houses completed in 2022 had a patio, porch or deck, up from 86% in 2010, when this data was first collected. Four percent had all three.

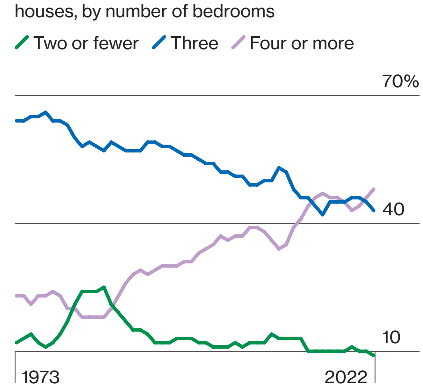
● OLDER, FEWER
According to 2021 Census Bureau data, among existing single-family houses in the US, only

33%

have four or more bedrooms.

● SHRINKING HOUSEHOLDS
According to 2022 census data, most US households—64%—had just one or two people, up from 41% in 1960. The average household size was 2.5 people, down from 3.3 in 1960.

● Share of newly completed US single-family houses, by number of bedrooms



● LESS WAITING
Of the new single-family houses completed in 2022, 35% had three or more bathrooms, down from an all-time peak of 38% in 2015.

ILLUSTRATION BY GEORGE WYLESOL. DATA: US CENSUS BUREAU

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